

FCC / IC Radio Test Report

Applicant : Toshiba Corporation
Digital Products & Services Company. 2-9 Suehiro-cho,
Ome shi, Tokyo 198-8710, Japan

Manufacturer : Toshiba Corporation
2-9 Suehiro-cho, Ome shi, Tokyo 198-8710, Japan

Equipment : 1X1 802.11b/g/n PCIe M.2 Module

Brand Name : Toshiba

Model No. : QCNFA125

FCC ID : CJ6UPA5197WL

IC ID : 248H-DPA5197WL

Standard : 47 CFR FCC Part 15.247
RSS-210 Issue 8

Operating Band : 2400 MHz – 2483.5 MHz

The product sample received on Jan. 14, 2014 and completely tested on Jan. 24, 2014. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

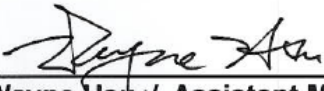

Wayne Hsu / Assistant Manager

Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Support Equipment.....	7
1.3	Testing Applied Standards	7
1.4	Testing Location Information.....	7
1.5	Measurement Uncertainty	8
2	TEST CONFIGURATION OF EUT	9
2.1	Test Setup Diagram	9
3	TRANSMITTER TEST RESULT	10
3.1	6dB Bandwidth	10
3.2	RF Output Power.....	13
3.3	Power Spectral Density	17
3.4	Emission in Non-Restricted Frequency Bands.....	20
3.5	Emission in Restricted Frequency Bands	25
3.6	AC Power-line Conducted Emissions	51
4	TEST EQUIPMENT AND CALIBRATION DATA	54
APPENDIX A. TEST PHOTOS		
APPENDIX B. PHOTOGRAPHS OF EUT		

Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Typical Data	Limit	Result
1.1.2	15.203	Antenna Requirement	Antenna connector mechanism complied	According to FCC 15.203	Complied
3.1	15.247(a) / RSS-210 A8.2 / /RSS-Gen 4.6.1	6dB Bandwidth	20M: 9.63 MHz 40M: 33.72 MHz	≥500kHz	Complied
		99% Bandwidth	20M: 17.78 MHz 40M: 36.18 MHz		
3.2	15.247(b) / RSS-210 A8.4	RF Output Power (Maximum Peak Conducted Output Power)	11 b: 21.14 dBm 11 g: 22.97 dBm 11 n HT20: 21.24 dBm 11 n HT40: 21.26 dBm	≤ 30 dBm	Complied
3.3	15.247(e) / RSS-210 A8.2	Power Spectral Density	11 b: -8.40 dBm/100kHz 11 g: -11.72 dBm/100kHz 11 n HT20: -13.14 dBm/100kHz 11 n HT40: -15.80 dBm/100kHz	≤ 8 dBm/3kHz	Complied
3.4	15.247(d) / RSS-210 A8.5	Emission in Non-Restricted Frequency Bands	Non-Restricted Bands	Non-Restricted Bands: > 20 dBc	Complied
3.5	15.247(d) / RSS-210 A8.5	Emission in Restricted Frequency Bands	Restricted Bands 2389.88 MHz -24.30 dBm - PK -43.40 dBm - AV	Restricted Bands: According to FCC 15.209 / RSS-Gen 6.1	Complied
3.6	15.207 / RSS-Gen 7.2.4	AC Power-line Conducted Emissions	0.1924150 MHz 48.86 dBuV – QP 39.28 dBuV - AV	According to FCC 15.207 / RSS-Gen 7.2.4	Complied

Revision History

[illegible]

1 General Description

1.1 Information

1.1.1 RF General Information (WLAN)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	RF Output Power (dBm)
2400~2483.5	b	2412, 2417, 2422, 2427, 2432, 2437, 2442, 2447, 2452, 2457, 2462	11	1	21.14
	g	2412, 2417, 2422, 2427, 2432, 2437, 2442, 2447, 2452, 2457, 2462	11	1	22.97
	n (HT20)	2412, 2417, 2422, 2427, 2432, 2437, 2442, 2447, 2452, 2457, 2462	11	1	21.24
	n (HT40)	2422, 2427, 2432, 2437, 2442, 2447, 2452	7	1	21.26
Note 1: RF output power specifies that Maximum Peak Conducted Output Power. Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation. Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

Note: Chain 0 can both transmit and receive a radio signal.
Chain 1 will be received radio signal.

1.1.2 Antenna Information

Antenna Category	
☒	External antenna (dedicated antennas)
☒	RF connector provided
☒	Unique antenna connector. (e.g., MMCX, U.FL, IPX, and RP-SMA, RP-N type...)
☐	Standard antenna connector. (e.g., SMA, N, BNC, and TNC type...)

Antenna General Information		
No.	Frequency Band	Maximum Gain (dBi)
1	2400~2483.5MHz	3.62
2	2400~2483.5MHz	3.20

1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	☐ Production ; ☐ Pre-Production ; ☒ Prototype
Type of EUT	
☒	Stand-alone
☐	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ...
☐	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
☐	Other:

1.1.4 Test Signal Duty Cycle

Operated Mode for Duty Cycle	
☐	Operated normally mode for duty cycle
☒	Operated test mode for duty cycle
Test Signal Duty Cycle (x)	Power Duty Factor [dB] – (10 log 1/x)
☒ 100% - IEEE 802.11b	0
☒ 100% - IEEE 802.11g	0
☒ 98.97% - IEEE 802.11n (HT20)	0.05
☒ 100% - IEEE 802.11n (HT40)	0

1.1.5 EUT Operational Condition

Supply Voltage	☐ AC mains	☒ DC	
Type of DC Source	☐ Internal DC supply	☒ Host	☐ Battery

1.2 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5530	DoC
2	Test Fixture	--	--	--
3	50Ω Terminal	--	--	--

1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ◆ 47 CFR FCC Part 15 Subpart C 15.247
- ◆ RSS-210 Issue 8
- ◆ RSS-GEN Issue 3
- ◆ ANSI C63.10-2009
- ◆ FCC KDB 558074
- ◆ FCC KDB 662911
- ◆ FCC KDB 412172

1.4 Testing Location Information

Testing Location			
☒	HWA YA	ADD : No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.	
		TEL : 886-3-327-3456 FAX : 886-3-327-0973	
Test Condition		Test Site No.	Test Engineer
AC Conduction		CO04-HY	Zeus
RF Conducted		TH06-HY	Cain
Radiated Emission		03CH02-HY	Hsiao
			Test Environment
			21.5°C / 39%
			23.1°C / 61.5%
			21.5°C / 39%

1.5 Measurement Uncertainty

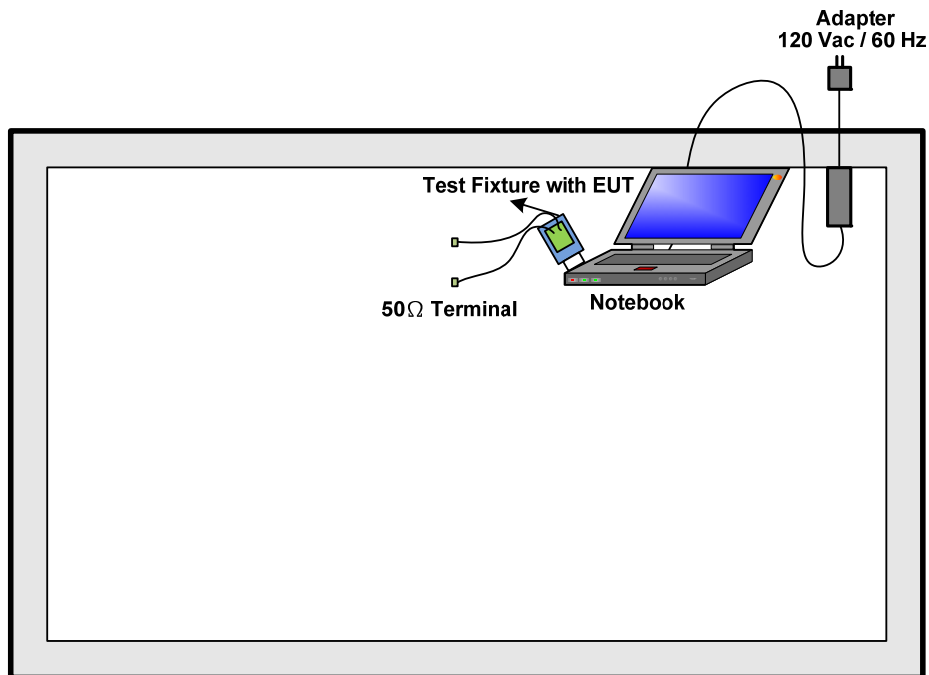
ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty		
Test Item		Uncertainty
AC power-line conducted emissions		±2.26 dB
Emission bandwidth, 6dB bandwidth		±1.42 %
RF output power, conducted		±0.63 dB
Power density, conducted		±0.81 dB
Unwanted emissions, conducted	9 – 150 kHz	±0.38 dB
	0.15 – 30 MHz	±0.42 dB
	30 – 1000 MHz	±0.51 dB
	1 – 18 GHz	±0.67 dB
	18 – 40 GHz	±0.83 dB
	40 – 200 GHz	N/A
All emissions, radiated	9 – 150 kHz	±2.49 dB
	0.15 – 30 MHz	±2.28 dB
	30 – 1000 MHz	±2.56 dB
	1 – 18 GHz	±3.59 dB
	18 – 40 GHz	±3.82 dB
	40 – 200 GHz	N/A
Temperature		±0.8 °C
Humidity		±3 %
DC and low frequency voltages		±3 %
Time		±1.42 %
Duty Cycle		±1.42 %

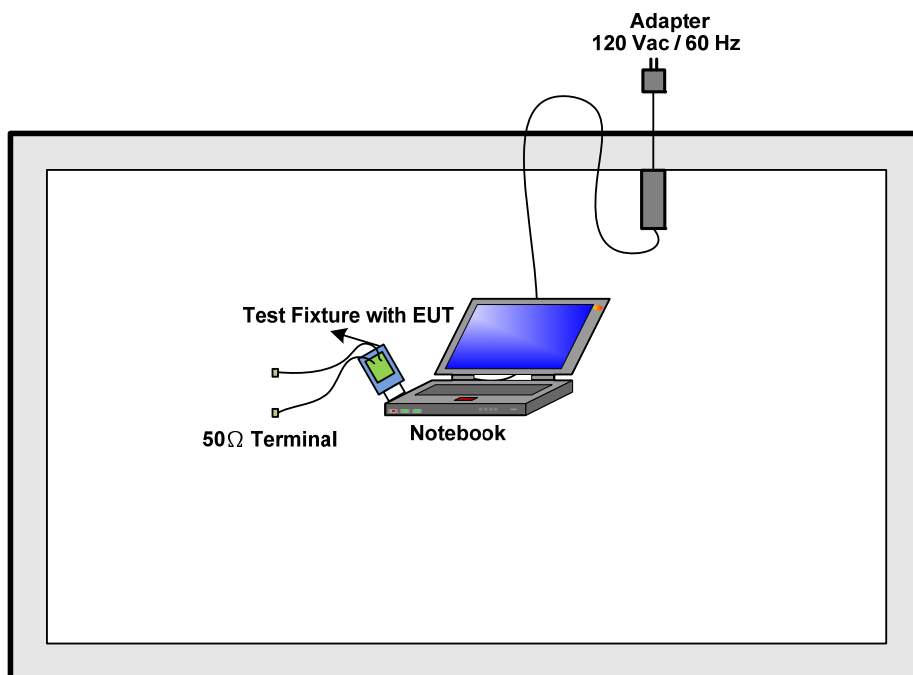
2 Test Configuration of EUT

2.1 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Test Setup Diagram - Radiated Test



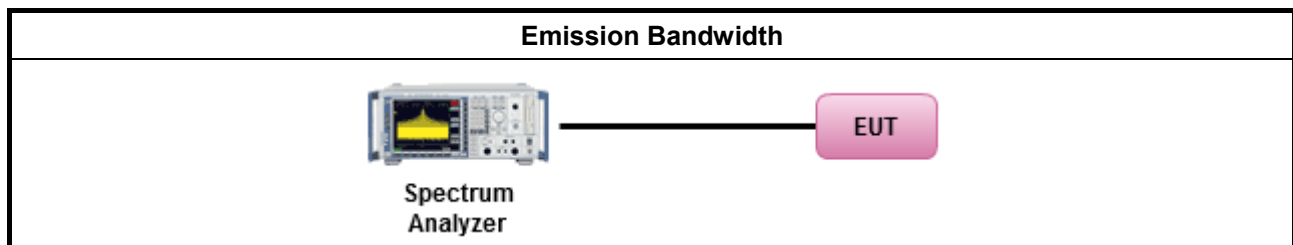
3 Transmitter Test Result

3.1 6dB Bandwidth

3.1.1 Test Procedures

Test Method	
☒	For the emission bandwidth shall be measured using one of the options below:
☒	Refer as FCC KDB 558074, clause 8.1 Option 1 for 6 dB bandwidth measurement.
☒	Refer as RSS-210 A8.2 for 6 dB bandwidth and RSS-Gen section 4.6.1 for 99% dB bandwidth measurement.
☐	Refer as FCC KDB 558074, clause 8.2 Option 2 for 6 dB bandwidth measurement.
☐	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain.
☐	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☐	The EUT supports multiple transmit chains using options given below:
☐	Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1
☐	Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains.

3.1.2 Test Setup

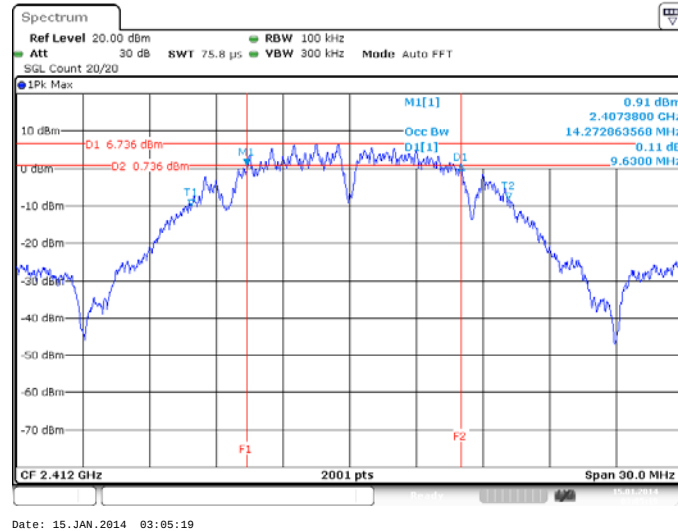


3.1.3 Test Result of Emission Bandwidth

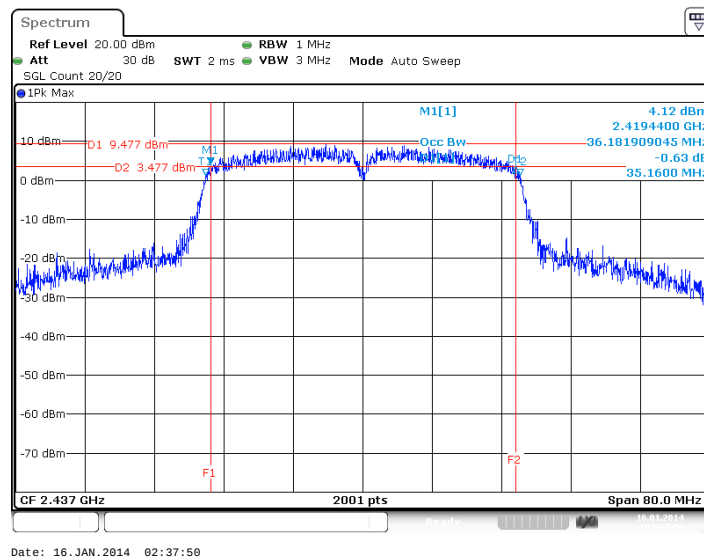
Emission Bandwidth Result				
Condition			Emission Bandwidth (MHz)	
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth	6dB Bandwidth
11b_11Mbps	1	2412	14.21	9.63
11b_11Mbps	1	2437	14.37	9.75
11b_11Mbps	1	2462	14.24	9.85
11g_6Mbps	1	2412	16.55	16.47
11g_6Mbps	1	2437	17.33	16.47
11g_6Mbps	1	2462	16.58	16.44
HT-20_MCS0	1	2412	17.64	17.71
HT-20_MCS0	1	2437	17.78	17.70
HT-20_MCS0	1	2462	17.73	17.68
HT-40_MCS0	1	2422	36.06	34.40
HT-40_MCS0	1	2437	36.18	33.72
HT-40_MCS0	1	2452	36.10	33.84
Limit			N/A	≥500 kHz
Result			Complied	
Note 1: N _{TX} = Number of Transmit Chains				

Worst Emission Bandwidth Plots

6dB bandwidth



99% bandwidth

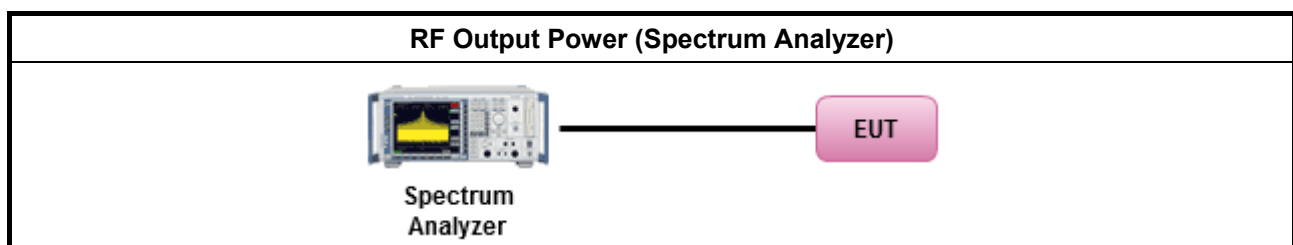


3.2 RF Output Power

3.2.1 Test Procedures

Test Method	
☒	Maximum Peak Conducted Output Power
☐	Refer as FCC KDB 558074, clause 9.1.1 Option 1 (RBW ≥ EBW method).
☒	Refer as FCC KDB 558074, clause 9.1.2 Option 2 (integrated band power method).
☐	Refer as FCC KDB 558074, clause 9.1.3 Option 2 (peak power meter for VBW ≥ DTS BW)
☒	Maximum Conducted Output Power
	[duty cycle ≥ 98% or external video / power trigger]
☒	Refer as FCC KDB 558074, clause 9.2.2.2 Method AVGSA-1 (spectral trace averaging).
☐	Refer as FCC KDB 558074, clause 9.2.2.3 Method AVGSA-1 Alt. (slow sweep speed)
	duty cycle < 98% and average over on/off periods with duty factor
☐	Refer as FCC KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
☐	Refer as FCC KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
	RF power meter and average over on/off periods with duty factor or gated trigger
☐	Refer as FCC KDB 558074, clause 9.2.3 Method AVGPM (using an RF average power meter).
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain.
☐	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☐	The EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
☐	If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.2.2 Test Setup



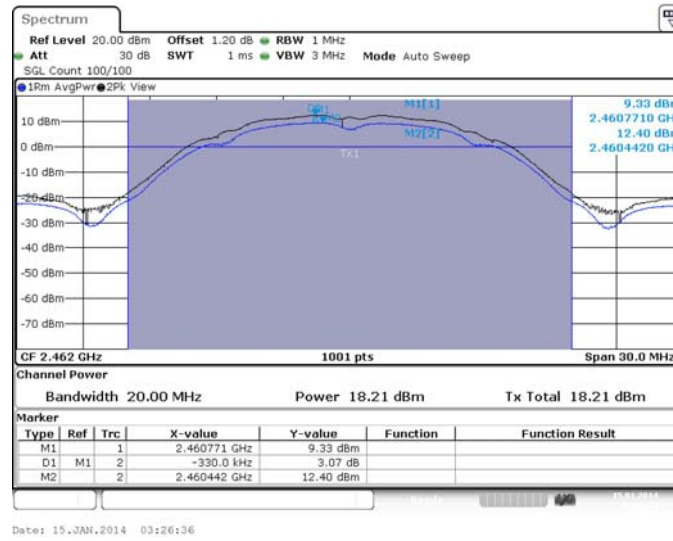
3.2.3 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result							
Condition			RF Output Power (dBm)				
Modulation Mode	N _{TX}	Freq. (MHz)	Output Power	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11b_11Mbps	1	2412	20.96	30.00	3.62	24.58	36.00
11b_11Mbps	1	2437	20.99	30.00	3.62	24.61	36.00
11b_11Mbps	1	2462	21.14	30.00	3.62	24.76	36.00
11g_6Mbps	1	2412	17.62	30.00	3.62	21.24	36.00
11g_6Mbps	1	2437	22.97	30.00	3.62	26.59	36.00
11g_6Mbps	1	2462	17.53	30.00	3.62	21.15	36.00
HT-20_MCS0	1	2412	16.36	30.00	3.62	19.98	36.00
HT-20_MCS0	1	2437	21.24	30.00	3.62	24.86	36.00
HT-20_MCS0	1	2462	16.34	30.00	3.62	19.96	36.00
HT-40_MCS0	1	2422	16.10	30.00	3.62	19.72	36.00
HT-40_MCS0	1	2437	21.26	30.00	3.62	24.88	36.00
HT-40_MCS0	1	2452	16.07	30.00	3.62	19.69	36.00
Result			Complied				
Note : The above modulation modes have the worst test results and record in the report.							

3.2.4 Test Result of Maximum Average Conducted Output Power

Maximum Average Conducted Output Power Result							
Condition			RF Output Power (dBm)				
Modulation Mode	N _{TX}	Freq. (MHz)	Output Power	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11b_11Mbps	1	2412	18.01	30.00	3.62	21.63	36.00
11b_11Mbps	1	2437	18.17	30.00	3.62	21.79	36.00
11b_11Mbps	1	2462	18.21	30.00	3.62	21.83	36.00
11g_6Mbps	1	2412	12.71	30.00	3.62	16.33	36.00
11g_6Mbps	1	2437	18.05	30.00	3.62	21.67	36.00
11g_6Mbps	1	2462	12.56	30.00	3.62	16.18	36.00
HT-20_MCS0	1	2412	11.36	30.00	3.62	14.98	36.00
HT-20_MCS0	1	2437	16.30	30.00	3.62	19.92	36.00
HT-20_MCS0	1	2462	11.28	30.00	3.62	14.90	36.00
HT-40_MCS0	1	2422	11.00	30.00	3.62	14.62	36.00
HT-40_MCS0	1	2437	16.09	30.00	3.62	19.71	36.00
HT-40_MCS0	1	2452	11.05	30.00	3.62	14.67	36.00
Result			Complied				
Note : The above modulation modes have the worst test results and record in the report.							

Worst AV Conducted Output Power Plots

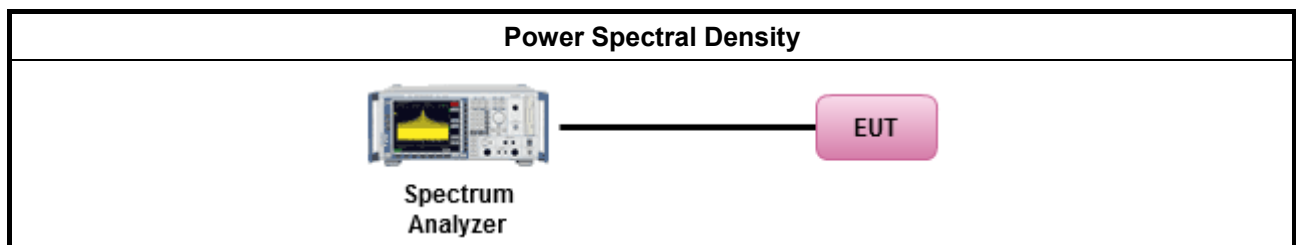


3.3 Power Spectral Density

3.3.1 Test Procedures

Test Method	
☒	Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).
☒	Refer as FCC KDB 558074, clause 10.2 Method PKPSD (RBW=3-100kHz;detector=peak).. [duty cycle $\geq$ 98% or external video / power trigger]
☐	Refer as FCC KDB 558074, clause 10.3 Method AVGPS-1 (spectral trace averaging).
☐	Refer as FCC KDB 558074, clause 10.4 Method AVGPS-1 Alt. (slow sweep speed) duty cycle < 98% and average over on/off periods with duty factor
☐	Refer as FCC KDB 558074, clause 10.5 Method AVGPS-2 (spectral trace averaging).
☐	Refer as FCC KDB 558074, clause 10.6 Method AVGPS-2 Alt. (slow sweep speed)
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain.
☐	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☐	The EUT supports multiple transmit chains using options given below:
☐	Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the N _{TX} output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.
☐	Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.

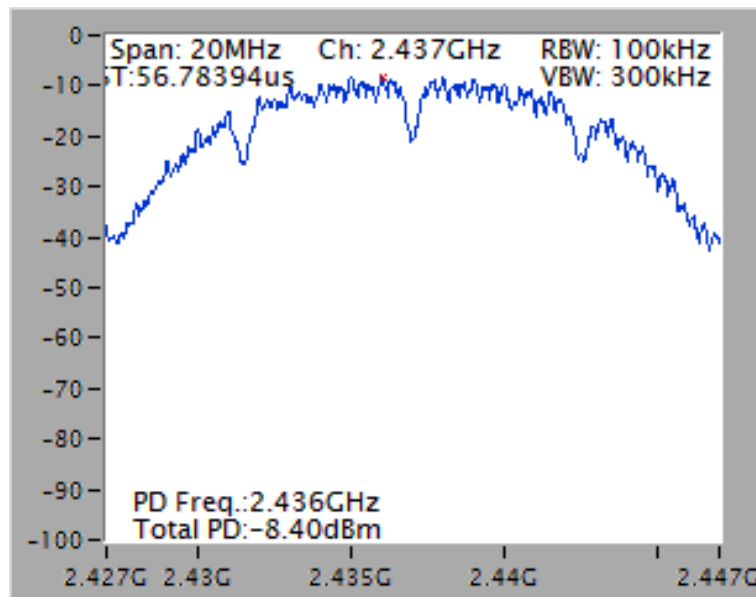
3.3.2 Test Setup



3.3.3 Test Result of Power Spectral Density

Power Spectral Density Result				
Condition			Power Spectral Density	
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain dBm/100kHz	Power Limit dBm/3kHz
11b_11Mbps	1	2412	-9.72	8
11b_11Mbps	1	2437	-8.40	8
11b_11Mbps	1	2462	-9.33	8
11g_6Mbps	1	2412	-17.26	8
11g_6Mbps	1	2437	-11.72	8
11g_6Mbps	1	2462	-17.55	8
HT-20_MCS0	1	2412	-17.25	8
HT-20_MCS0	1	2437	-13.14	8
HT-20_MCS0	1	2462	-18.19	8
HT-40_MCS0	1	2422	-19.32	8
HT-40_MCS0	1	2437	-15.80	8
HT-40_MCS0	1	2452	-19.44	8
Result			Complied	
Note : The above modulation modes have the worst test results and record in the report.				

Worst Power Spectral Density Plots

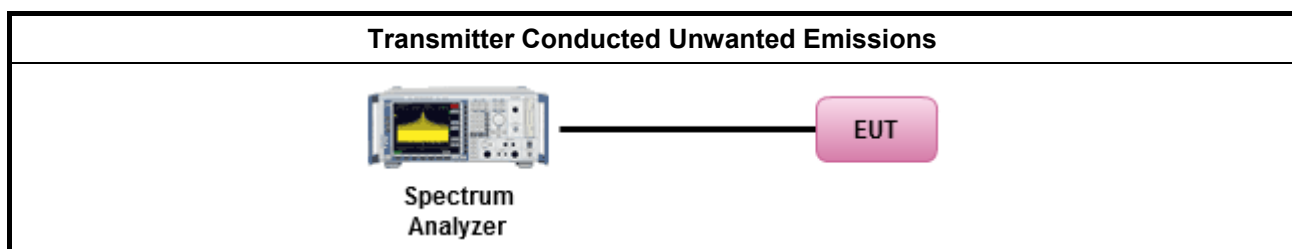


3.4 Emission in Non-Restricted Frequency Bands

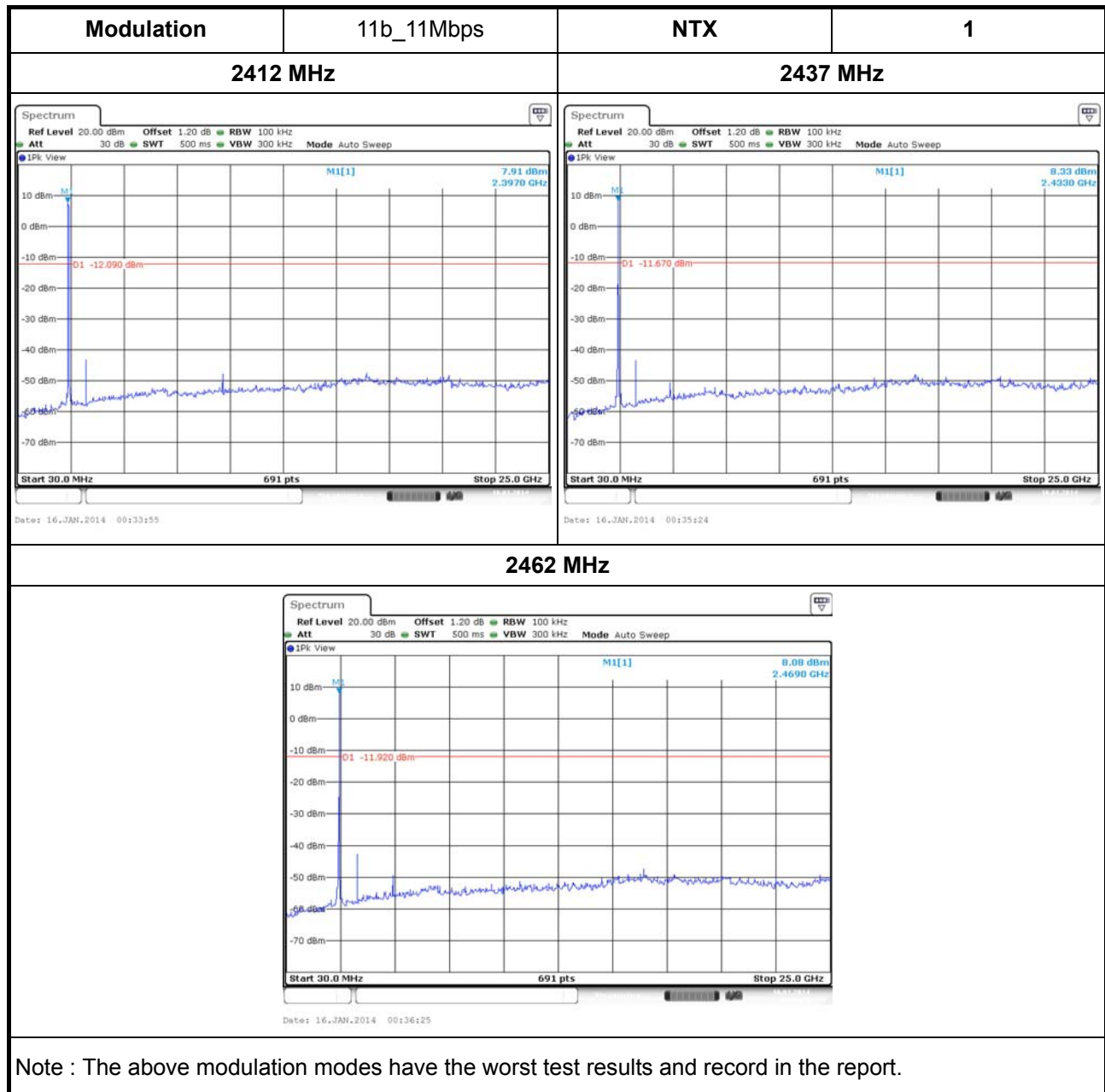
3.4.1 Test Procedures

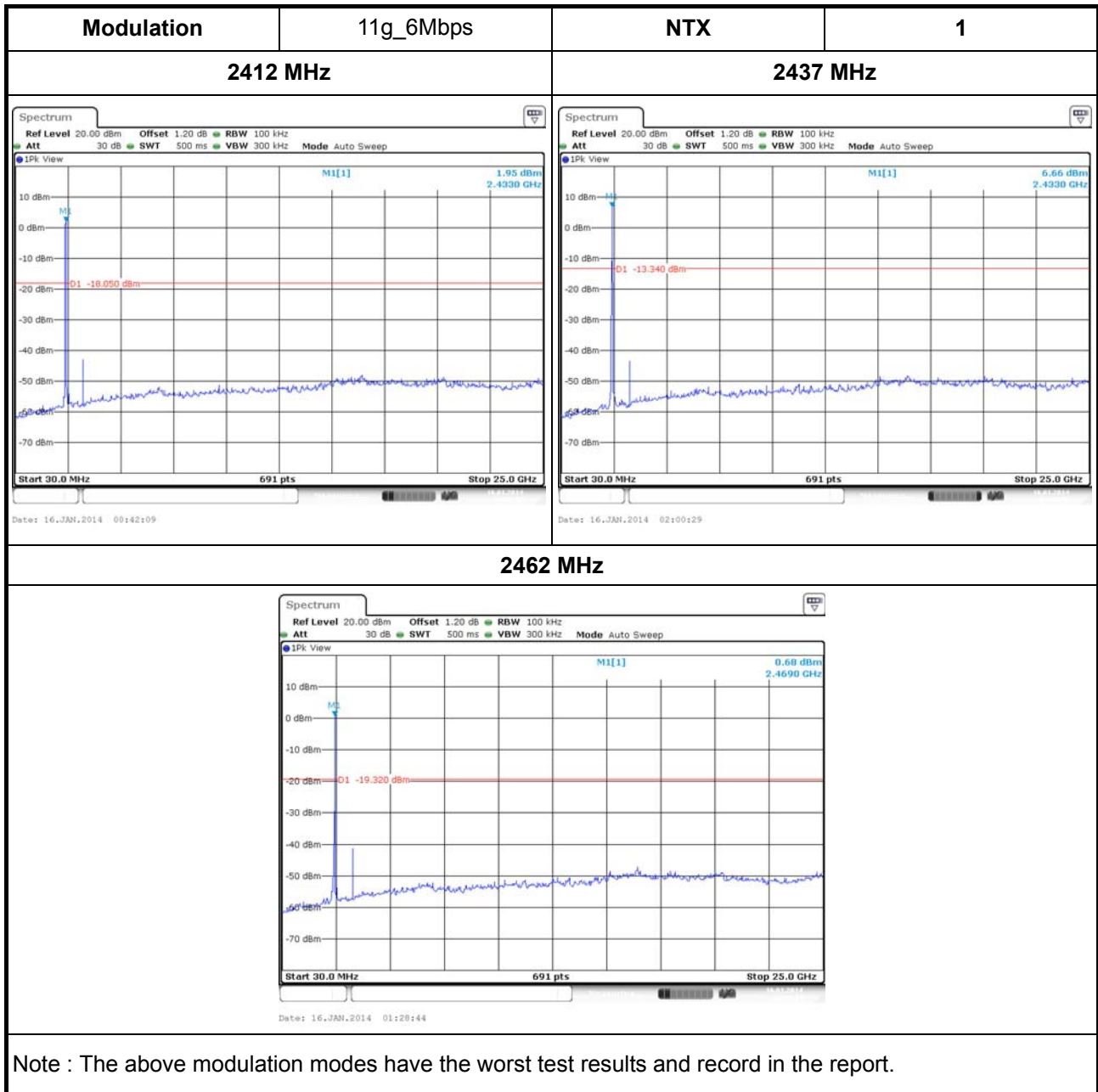
Test Method	
☒	The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].
☒	Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
☒	For the transmitter unwanted emissions shall be measured using following options below:
☒	Refer as FCC KDB 558074, clause 11 for unwanted emissions into non-restricted bands.
☒	For the transmitter bandedge emissions shall be measured using following options below:
☐	Refer as FCC KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
☒	Refer as ANSI C63.10, clause 6.9.2 for band-edge testing.
☐	Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.
☒	For conducted measurement, refer as FCC KDB 558074, clause 12.2.2.
☐	For conducted unwanted emissions into non-restricted bands (relative emission limits). Devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N) if the measurements are made relative to the in-band emissions on the individual outputs.
☐	For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB
☐	For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.

3.4.2 Test Setup

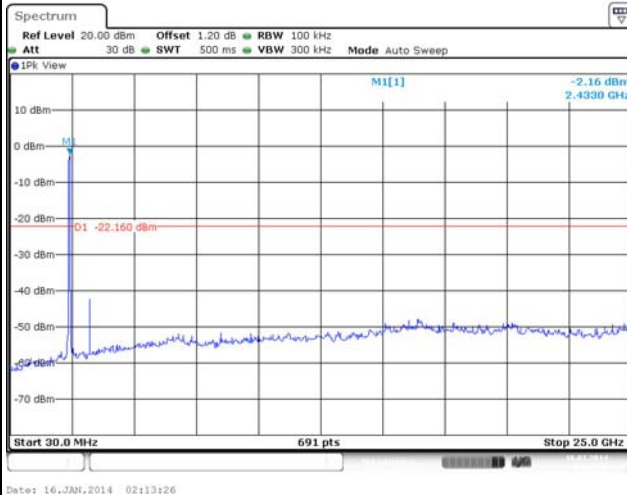
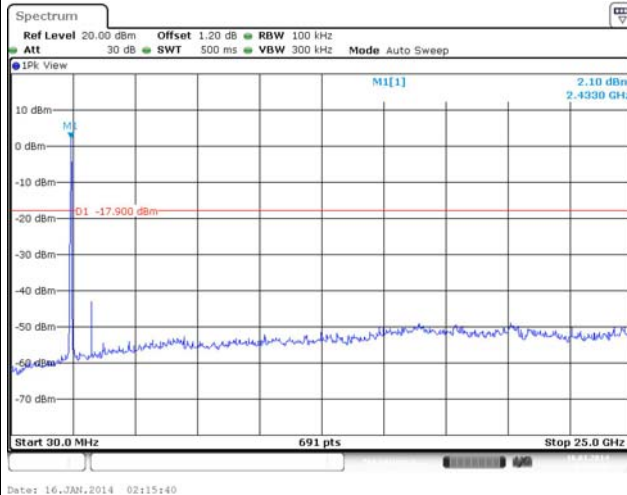
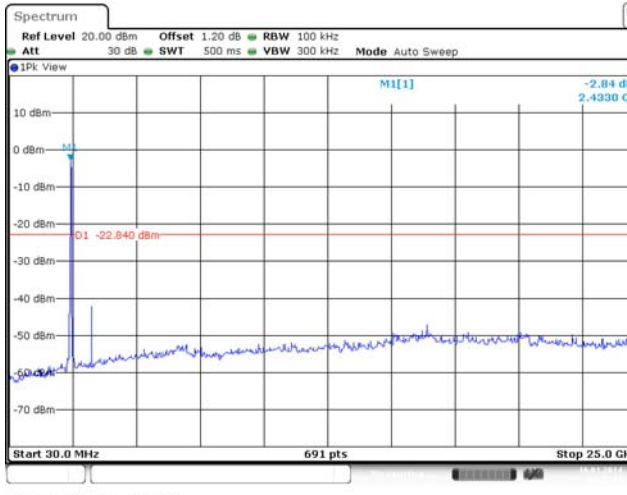


3.4.3 Test Result of Emission in Non-Restricted Frequency Bands





Modulation	HT-20_MCS0	NTX	1
2412 MHz		2437 MHz	
Spectrum Ref Level 20.00 dBm Offset 1.20 dB RBW 100 kHz Att 30 dB SWT 500 ms VBW 300 kHz Mode Auto Sweep 1Pk View M1[1] 0.56 dBm 2.3970 GHz M2 -19.440 dBm Start 30.0 MHz 691 pts Stop 25.0 GHz Date: 16.JAN.2014 02:03:43		Spectrum Ref Level 20.00 dBm Offset 1.20 dB RBW 100 kHz Att 30 dB SWT 500 ms VBW 300 kHz Mode Auto Sweep 1Pk View M1[1] 2.76 dBm 2.4330 GHz M2 -17.240 dBm Start 30.0 MHz 691 pts Stop 25.0 GHz Date: 16.JAN.2014 02:05:59	
2462 MHz			
Spectrum Ref Level 20.00 dBm Offset 1.20 dB RBW 100 kHz Att 30 dB SWT 500 ms VBW 300 kHz Mode Auto Sweep 1Pk View M1[1] 0.30 dBm 2.4690 GHz M2 -19.700 dBm Start 30.0 MHz 691 pts Stop 25.0 GHz Date: 16.JAN.2014 02:08:50			
Note : The above modulation modes have the worst test results and record in the report.			

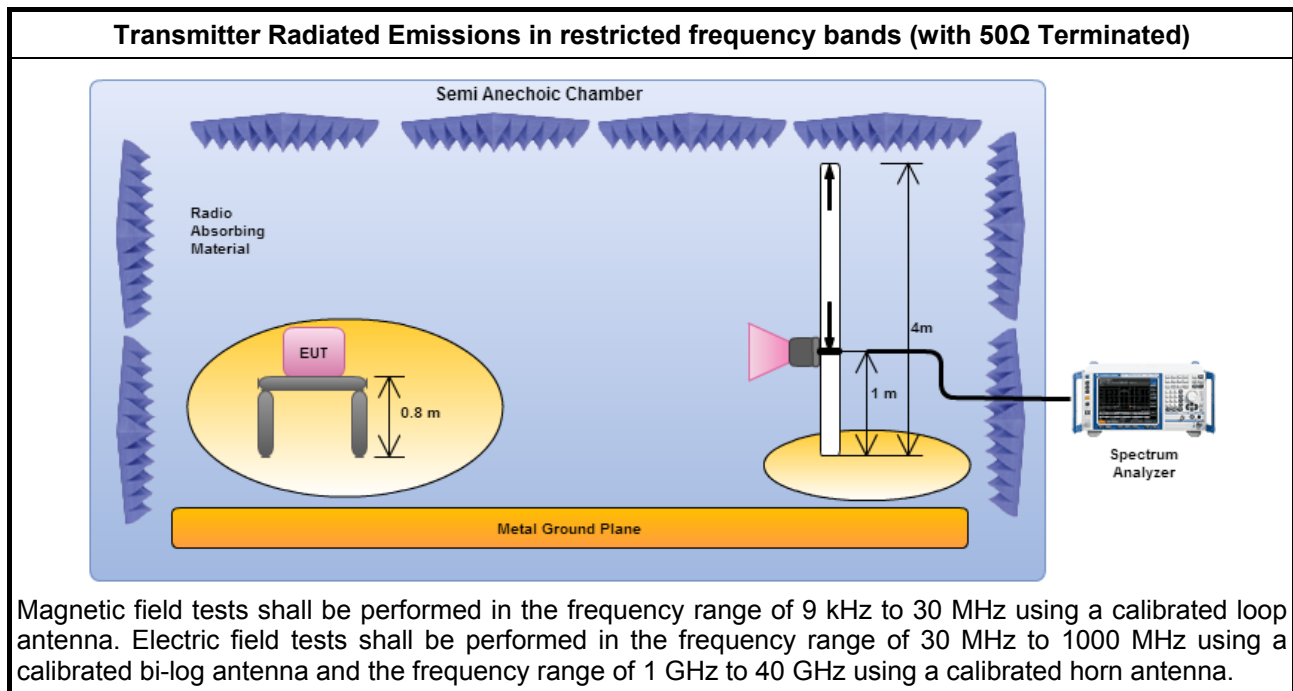
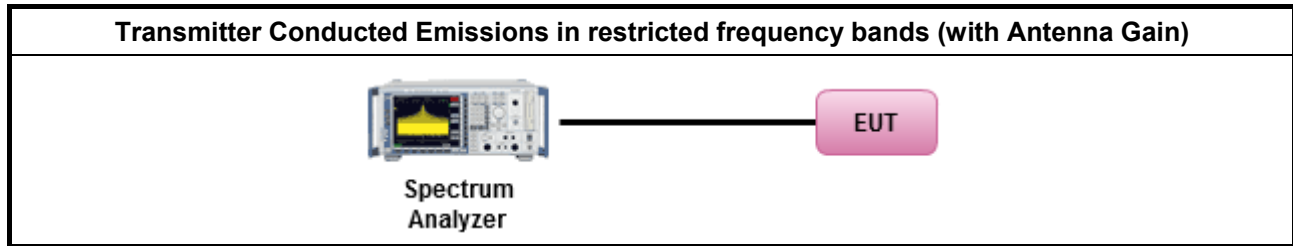
Modulation	HT-40_MCS0	NTX	1
2422 MHz		2437 MHz	
			
2452 MHz			
			
Note : The above modulation modes have the worst test results and record in the report.			

3.5 Emission in Restricted Frequency Bands

3.5.1 Test Procedures

Test Method	
☒	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
☒	Measurements in the frequency range 10 GHz - 18GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
☒	Measurements in the frequency range above 18 GHz - 25GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit.
☒	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
☒	For the transmitter unwanted emissions shall be measured using following options below:
☐	Refer as FCC KDB 558074, clause 11 for unwanted emissions into non-restricted bands.
☒	Refer as FCC KDB 558074, clause 12 for unwanted emissions into restricted bands.
☐	Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq 98\%$)
☐	Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
☒	Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW $\geq 1/T$).
☐	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW $\geq 1/T$, where T is pulse time.
☐	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
☒	Refer as FCC KDB 558074, clause 11.3 and 12.2.4 measurement procedure peak limit.
☒	Refer as FCC KDB 558074, clause 12.2.3 measurement procedure Quasi-Peak limit.
☒	For radiated measurement, refer as FCC KDB 558074, clause 12.2.7.
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
☒	Refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz.
☒	For conducted and cabinet radiation measurement, refer as FCC KDB 558074, clause 12.2.2.
☐	For conducted unwanted emissions into non-restricted bands (relative emission limits). Devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N) if the measurements are made relative to the in-band emissions on the individual outputs.
☐	For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB
☐	For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.

3.5.2 Test Setup



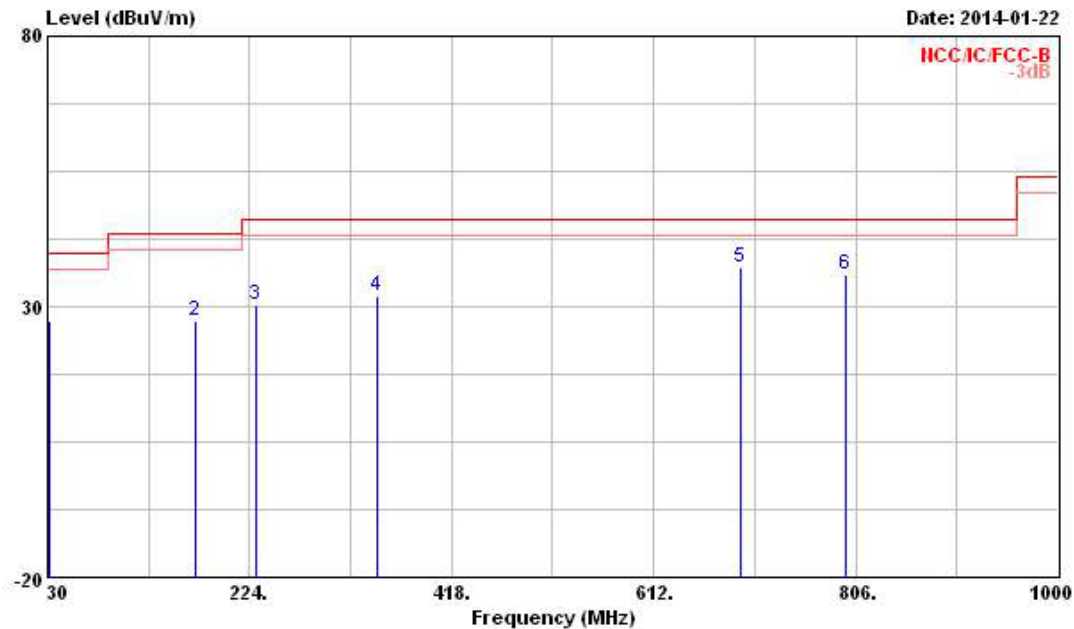
3.5.3 Emission in Restricted Frequency Bands- (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.5.4 Emission in Restricted Frequency Bands- (Below 1GHz)



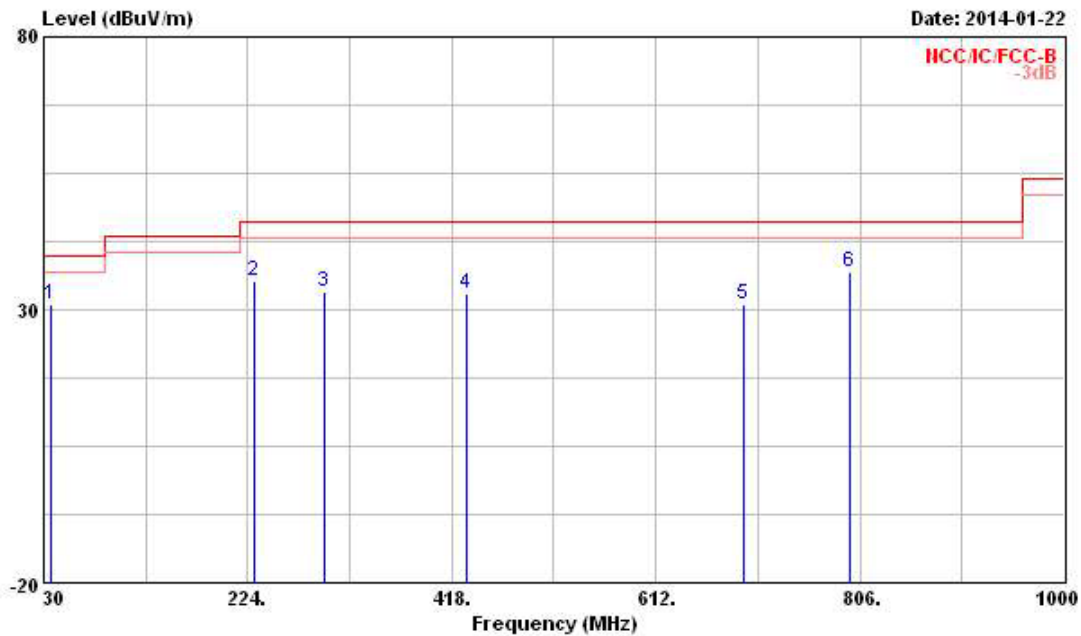
Operating Mode	11b_11Mbps	Polarization	V
Operating Frequency	2462 MHz	Configuration	with 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg
1	31.940	27.29	-12.71	40.00	36.70	17.57	0.79	27.77 Peak	---	---
2	172.590	27.27	-16.23	43.50	43.17	9.73	1.89	27.52 Peak	---	---
3	230.790	30.49	-15.51	46.00	45.20	10.36	2.27	27.34 Peak	---	---
4	347.190	32.07	-13.93	46.00	42.34	14.43	2.81	27.51 Peak	---	---
5	695.420	37.39	-8.61	46.00	42.70	18.98	4.02	28.31 Peak	---	---
6	797.270	35.96	-10.04	46.00	39.71	19.93	4.40	28.08 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

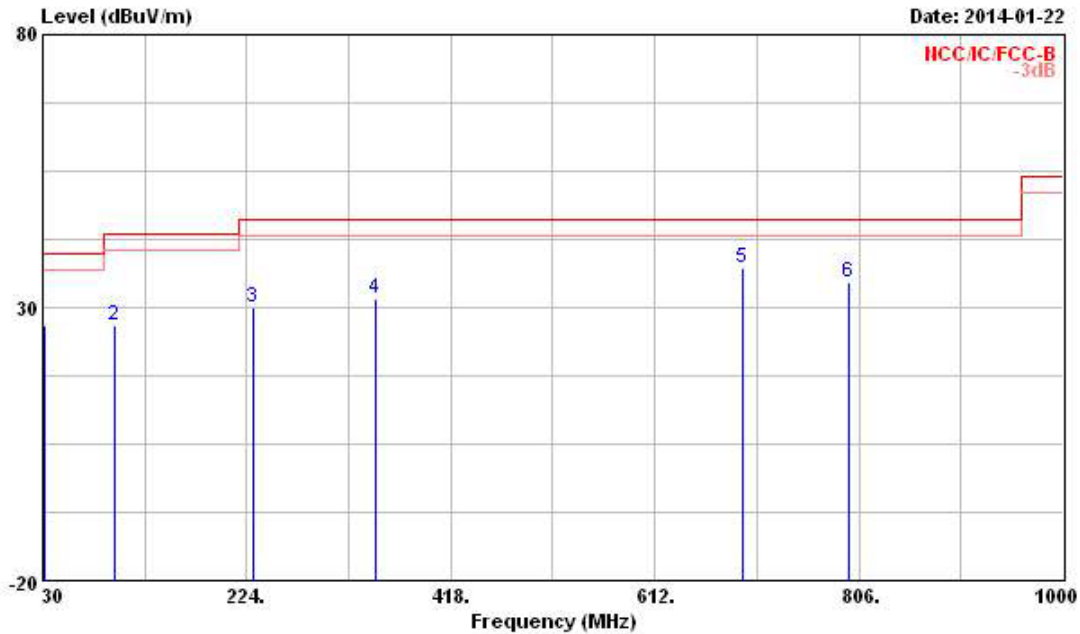
Operating Mode	11g_6Mbps	Polarization	H
Operating Frequency	2437 MHz	Configuration	with 50Ω Terminated



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	36.790	30.92	-9.08	40.00	42.82	14.97	0.83	27.70	Peak	---
2	230.790	35.33	-10.67	46.00	50.04	10.36	2.27	27.34	Peak	---
3	296.750	33.31	-12.69	46.00	44.73	13.20	2.54	27.16	Peak	---
4	431.580	32.94	-13.06	46.00	41.19	16.72	3.10	28.07	Peak	---
5	695.420	30.83	-15.17	46.00	36.14	18.98	4.02	28.31	Peak	---
6	796.300	36.94	-9.06	46.00	40.68	19.94	4.40	28.08	Peak	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

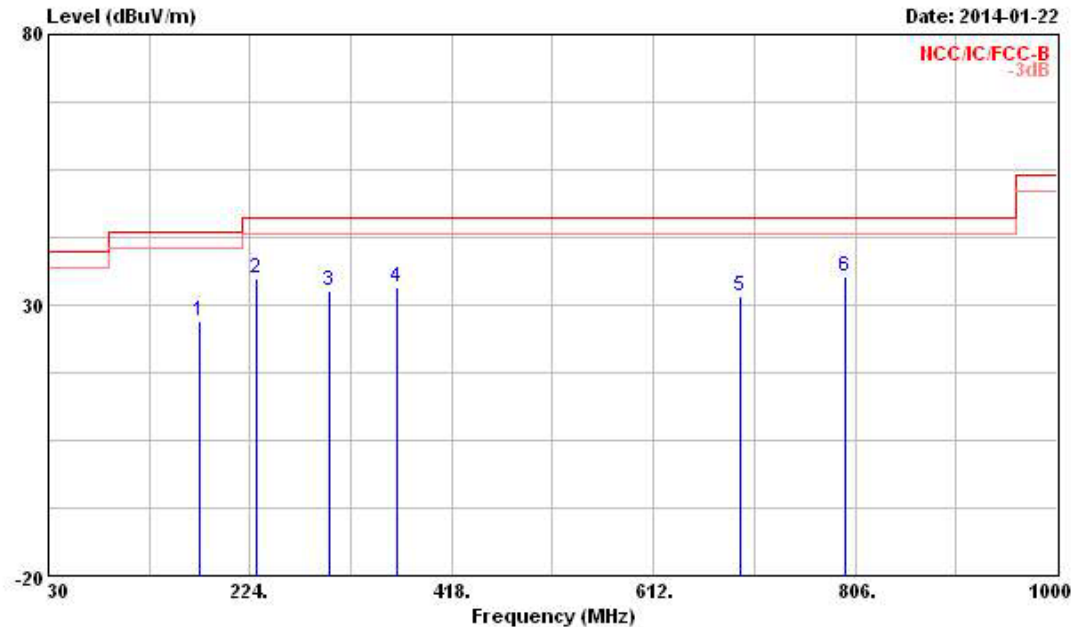
Operating Mode	11g_6Mbps	Polarization	V
Operating Frequency	2437 MHz	Configuration	with 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	31.940	26.56	-13.44	40.00	35.97	17.57	0.79	27.77	Peak	---	---
2	98.870	26.66	-16.84	43.50	42.38	10.63	1.39	27.74	Peak	---	---
3	230.790	30.01	-15.99	46.00	44.72	10.36	2.27	27.34	Peak	---	---
4	346.220	31.68	-14.32	46.00	42.01	14.37	2.80	27.50	Peak	---	---
5 @	695.420	37.29	-8.71	46.00	42.60	18.98	4.02	28.31	Peak	---	---
6	796.300	34.76	-11.24	46.00	38.50	19.94	4.40	28.08	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Operating Mode	HT-20_MCS0	Polarization	H
Operating Frequency	2437 MHz	Configuration	with 50Ω Terminated



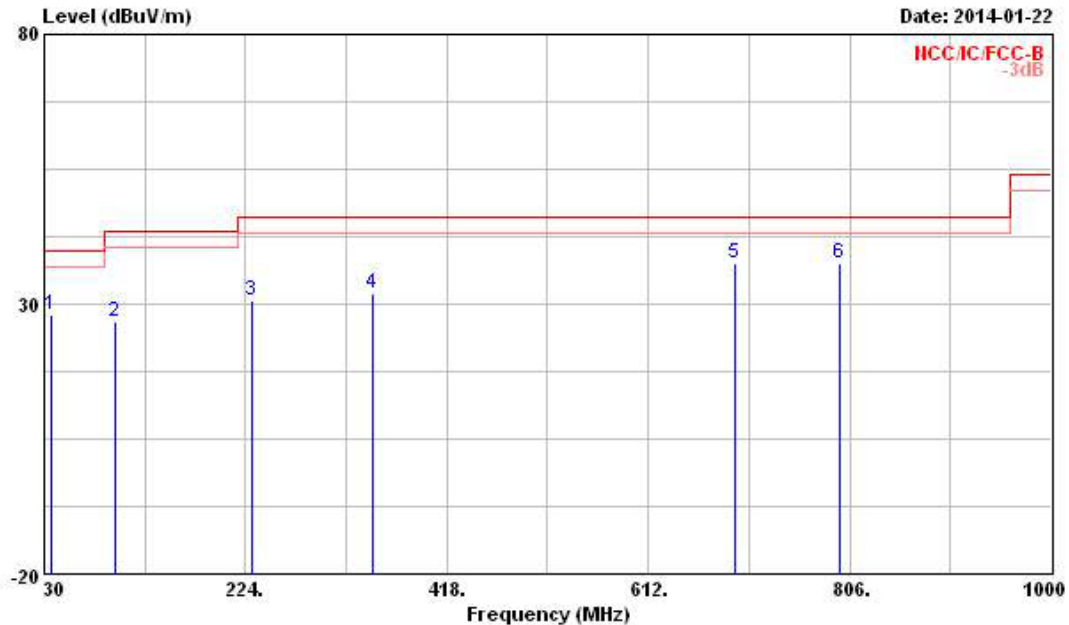
	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	175.500	27.04	-16.46	43.50	42.99	9.65	1.91	27.51	Peak	---
2	230.790	35.07	-10.93	46.00	49.78	10.36	2.27	27.34	Peak	---
3	299.660	32.70	-13.30	46.00	44.05	13.25	2.55	27.15	Peak	---
4	365.620	33.28	-12.72	46.00	43.18	14.88	2.87	27.65	Peak	---
5	695.420	31.53	-14.47	46.00	36.84	18.98	4.02	28.31	Peak	---
6	797.270	35.35	-10.65	46.00	39.10	19.93	4.40	28.08	Peak	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Operating Mode	HT-20_MCS0	Polarization	V
Operating Frequency	2437 MHz	Configuration	with 50Ω Terminated



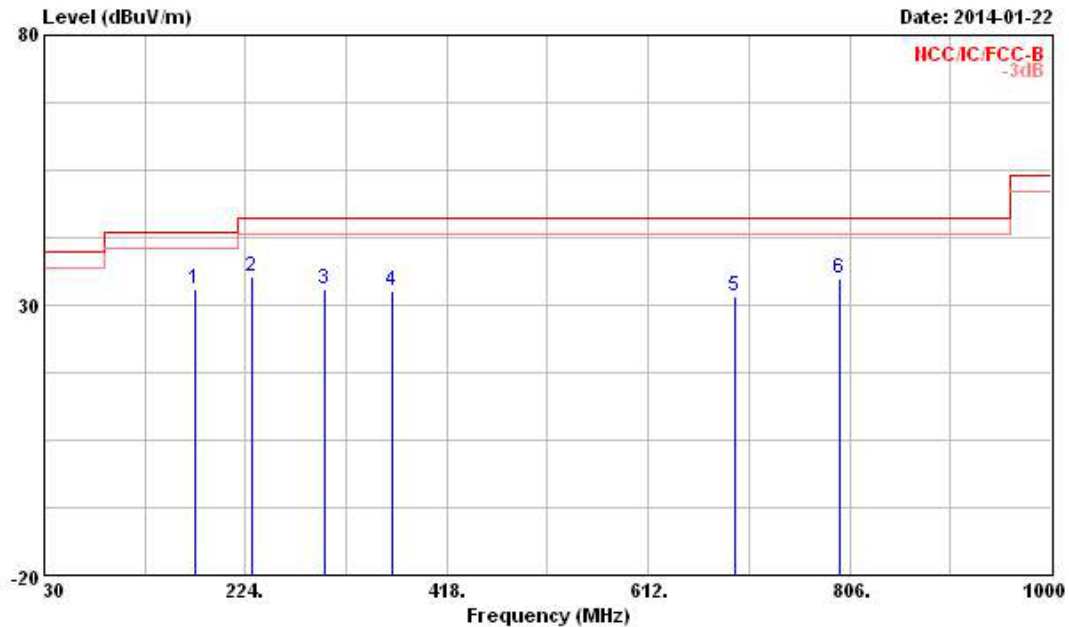
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	36.790	27.87	-12.13	40.00	39.77	14.97	0.83	27.70	Peak	---	---
2	98.870	26.77	-16.73	43.50	42.49	10.63	1.39	27.74	Peak	---	---
3	230.790	30.56	-15.44	46.00	45.27	10.36	2.27	27.34	Peak	---	---
4	346.220	31.99	-14.01	46.00	42.32	14.37	2.80	27.50	Peak	---	---
5	695.420	37.51	-8.49	46.00	42.82	18.98	4.02	28.31	Peak	---	---
6	796.300	37.52	-8.48	46.00	41.26	19.94	4.40	28.08	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Operating Mode	HT-40_MCS0	Polarization	H
Operating Frequency	2437 MHz	Configuration	with 50Ω Terminated



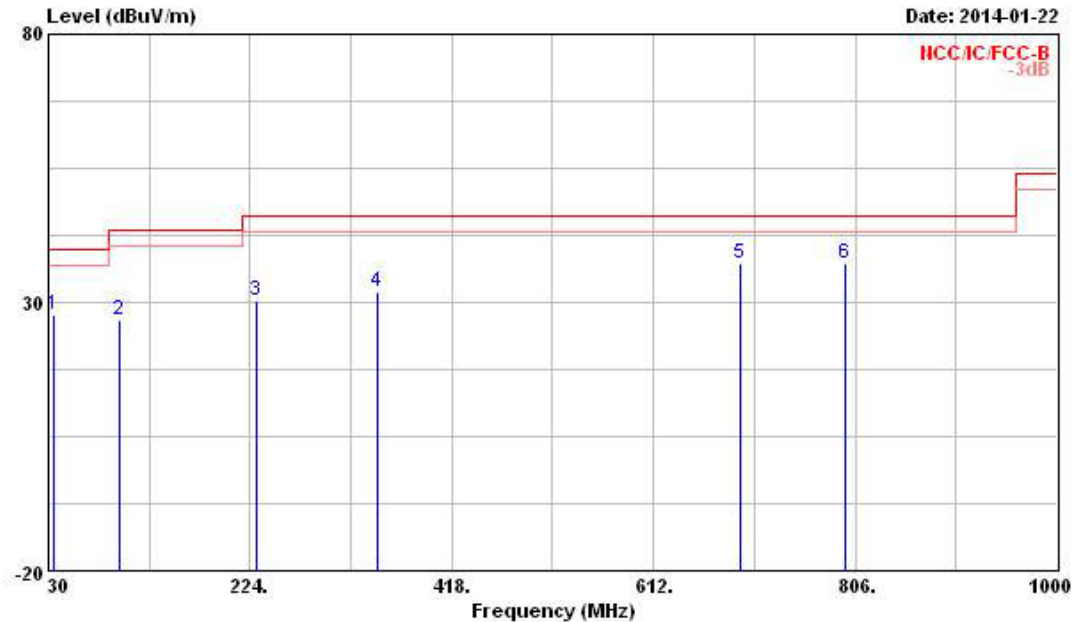
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	175.500	32.98	-10.52	43.50	48.93	9.65	1.91	27.51	Peak	---	---
2	230.790	35.17	-10.83	46.00	49.88	10.36	2.27	27.34	Peak	---	---
3	299.660	32.95	-13.05	46.00	44.30	13.25	2.55	27.15	Peak	---	---
4	365.620	32.78	-13.22	46.00	42.68	14.88	2.87	27.65	Peak	---	---
5	695.420	31.80	-14.20	46.00	37.11	18.98	4.02	28.31	Peak	---	---
6	797.270	34.90	-11.10	46.00	38.65	19.93	4.40	28.08	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Operating Mode	HT-40_MCS0	Polarization	V
Operating Frequency	2437 MHz	Configuration	with 50Ω Terminated



	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	35.820	27.58	-12.42	40.00	38.89	15.59	0.82	27.72	Peak	---	---
2	97.900	26.69	-16.81	43.50	42.54	10.51	1.38	27.74	Peak	---	---
3	230.790	30.34	-15.66	46.00	45.05	10.36	2.27	27.34	Peak	---	---
4	347.190	32.13	-13.87	46.00	42.40	14.43	2.81	27.51	Peak	---	---
5	695.420	37.29	-8.71	46.00	42.60	18.98	4.02	28.31	Peak	---	---
6	797.270	37.20	-8.80	46.00	40.95	19.93	4.40	28.08	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

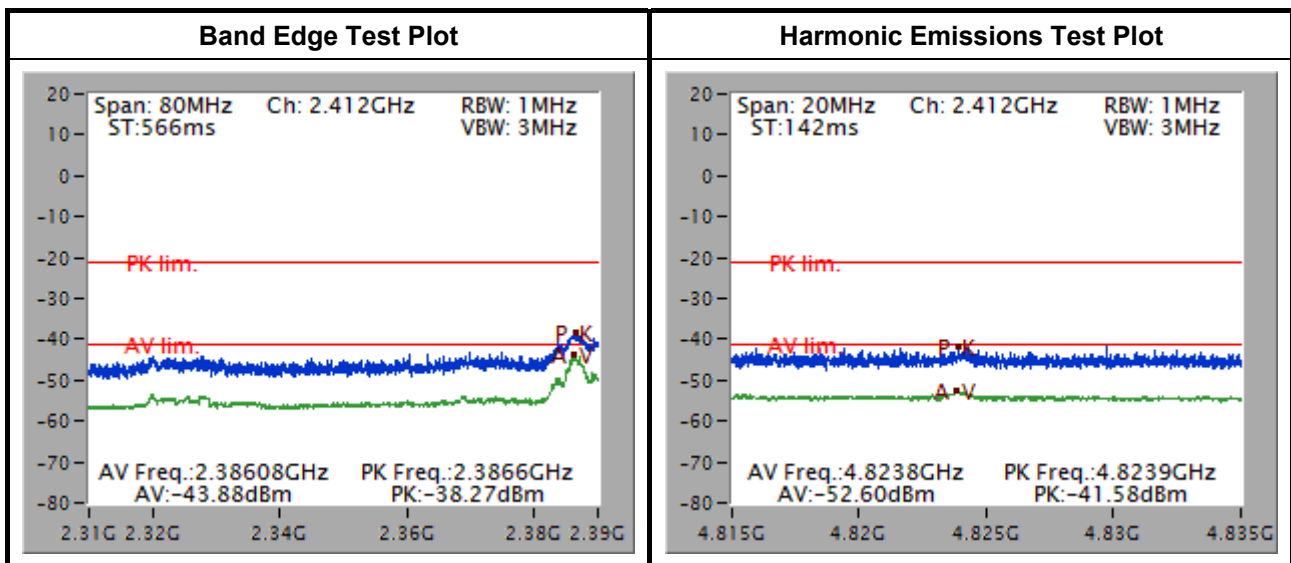
3.5.5 Emission in Restricted Frequency Bands- (Above 1GHz)

Antenna-ports conducted measurements are used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands; in the meanwhile, an additional radiated test with 50ohm terminator for cabinet spurious emission is also performed.

Modulation: 11b_11Mbps; Test Frequency: 2412 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands						
Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
2386.600	-41.89	3.62	-38.27	-17.07	-21.2	Peak
2386.080	-47.50	3.62	-43.88	-2.68	-41.2	Average
4823.900	-45.20	3.62	-41.58	-20.38	-21.2	Peak
4823.800	-56.22	3.62	-52.60	-11.40	-41.2	Average

Note 1 : The above modulation modes have the worst test results and record in the report.
Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported



Modulation: 11b_11Mbps; Test Frequency: 2437 MHz; number of TX Chain: 1

Transmitter Conducted Unwanted Emissions Result in Restricted Bands						
Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
4873.780	-45.34	3.62	-41.72	-20.52	-21.2	Peak
4873.980	-52.97	3.62	-49.35	-8.15	-41.2	Average

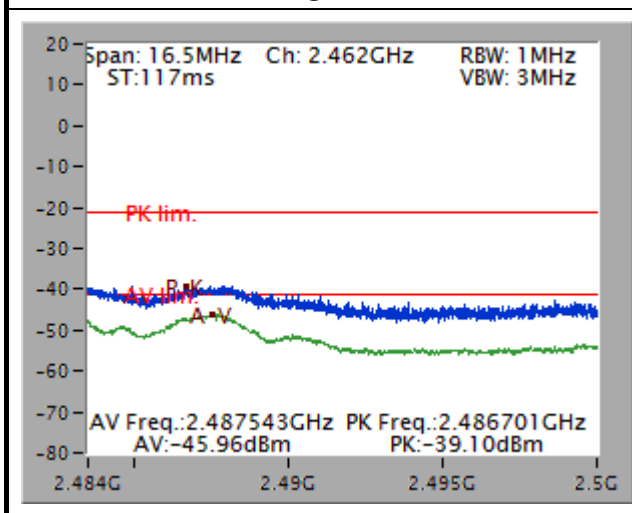
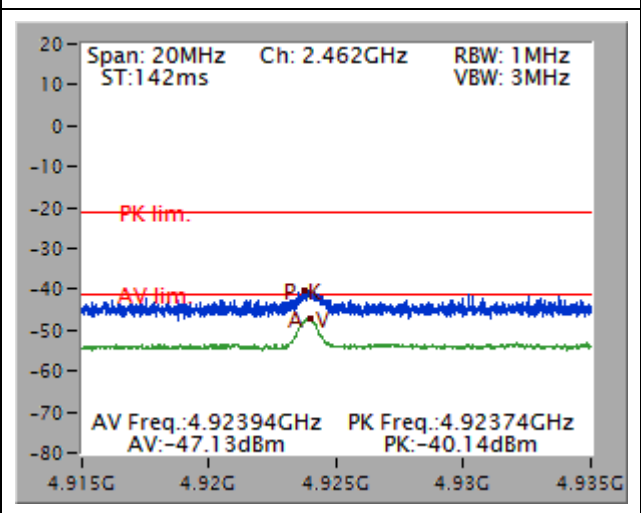
Note 1 : The above modulation modes have the worst test results and record in the report.
Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

Modulation: 11b_11Mbps; Test Frequency: 2462 MHz; number of TX Chain: 1
Transmitter Conducted Unwanted Emissions Result in Restricted Bands

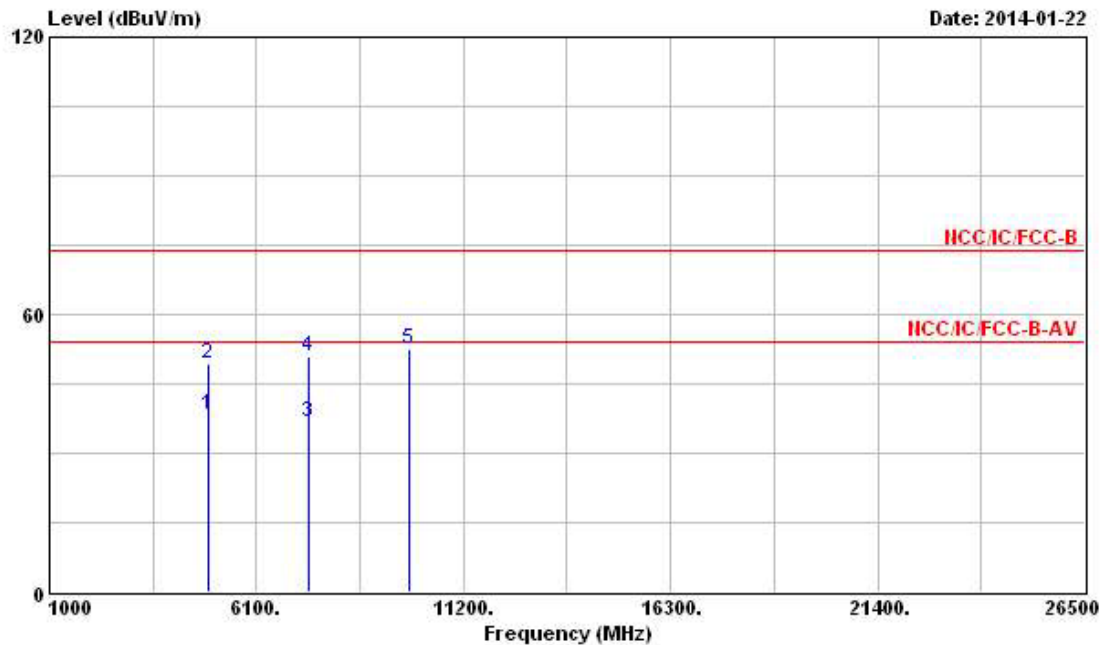
Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
2486.701	-42.72	3.62	-39.10	-17.90	-21.2	Peak
2475.430	-49.58	3.62	-45.96	-4.76	-41.2	Average
4923.740	-43.76	3.62	-40.14	-18.94	-21.2	Peak
4923.940	-50.75	3.62	-47.13	-5.93	-41.2	Average

Note 1 : The above modulation modes have the worst test results and record in the report.

Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

Band Edge Test Plot

Harmonic Emissions Test Plot


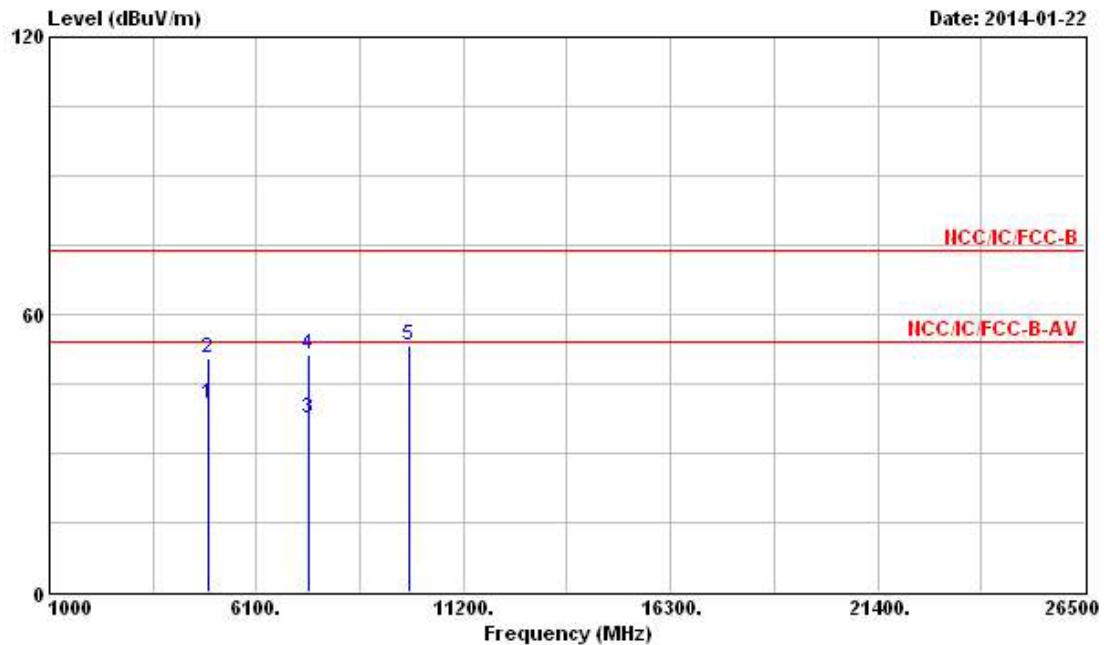
Operating Mode	11b_11Mbps	Polarization	H
Operating Frequency	2462 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	38.29	-15.71	54.00	33.85	34.31	4.79	34.66	Average	---	---
2	4924.000	49.18	-24.82	74.00	44.74	34.31	4.79	34.66	Peak	---	---
3	7386.000	36.83	-17.17	54.00	30.39	35.84	5.57	34.97	Average	---	---
4	7386.000	50.84	-23.16	74.00	44.40	35.84	5.57	34.97	Peak	---	---
5	9848.000	52.62			44.68	36.81	6.50	35.37	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Operating Mode	11b_11Mbps	Polarization	V
Operating Frequency	2462 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	40.62	-13.38	54.00	36.18	34.31	4.79	34.66	Average	---	---
2	4924.000	50.54	-23.46	74.00	46.10	34.31	4.79	34.66	Peak	---	---
3	7386.000	37.63	-16.37	54.00	31.19	35.84	5.57	34.97	Average	---	---
4	7386.000	51.32	-22.68	74.00	44.88	35.84	5.57	34.97	Peak	---	---
5	9848.000	53.35			45.41	36.81	6.50	35.37	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

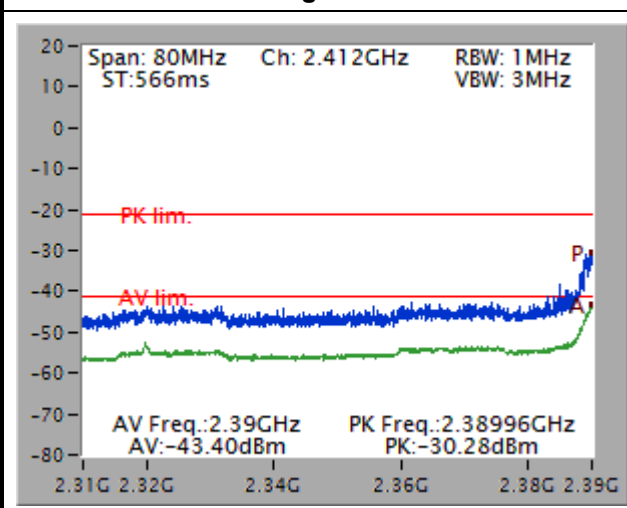
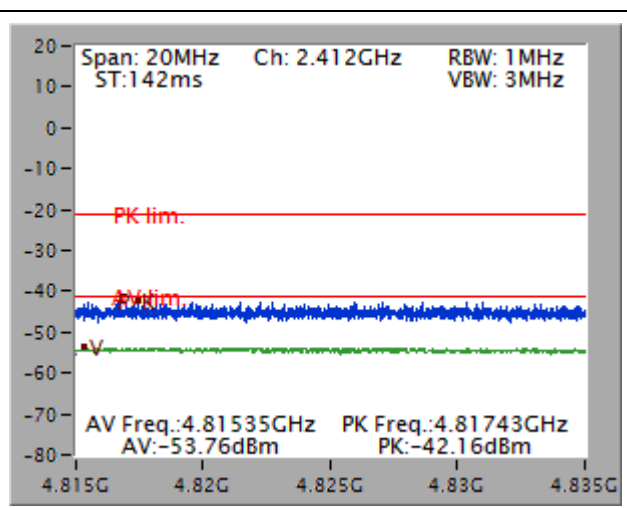
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Modulation: 11g_6Mbps; Test Frequency: 2412 MHz; number of TX Chain: 1
Transmitter Conducted Unwanted Emissions Result in Restricted Bands

Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
2389.960	-33.90	3.62	-30.28	-9.08	-21.2	Peak
2390.000	-47.02	3.62	-43.40	-2.20	-41.2	Average
4817.430	-45.78	3.62	-42.16	-20.96	-21.2	Peak
4815.350	-57.38	3.62	-53.76	-12.56	-41.2	Average

Note 1 : The above modulation modes have the worst test results and record in the report.

Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

Band Edge Test Plot

Harmonic Emissions Test Plot

Modulation: 11g_6Mbps; Test Frequency: 2437 MHz; number of TX Chain: 1
Transmitter Conducted Unwanted Emissions Result in Restricted Bands

Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
4876.340	-45.58	3.62	-41.96	-20.76	-21.2	Peak
4883.730	-57.18	3.62	-53.56	-12.36	-41.2	Average

Note 1 : The above modulation modes have the worst test results and record in the report.

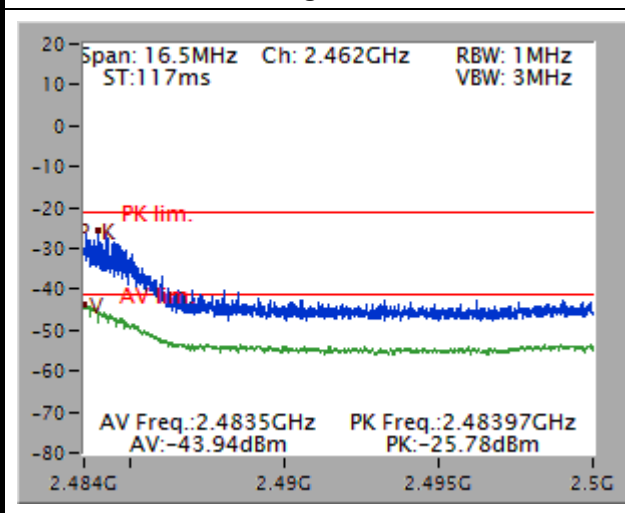
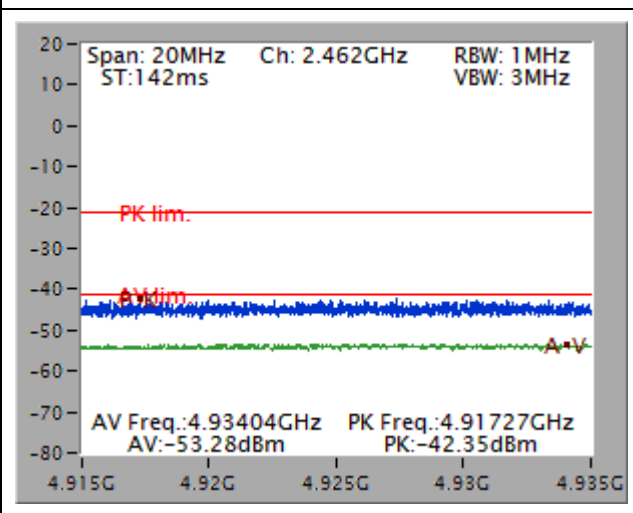
Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

Modulation: 11g_6Mbps; Test Frequency: 2462 MHz; number of TX Chain: 1
Transmitter Conducted Unwanted Emissions Result in Restricted Bands

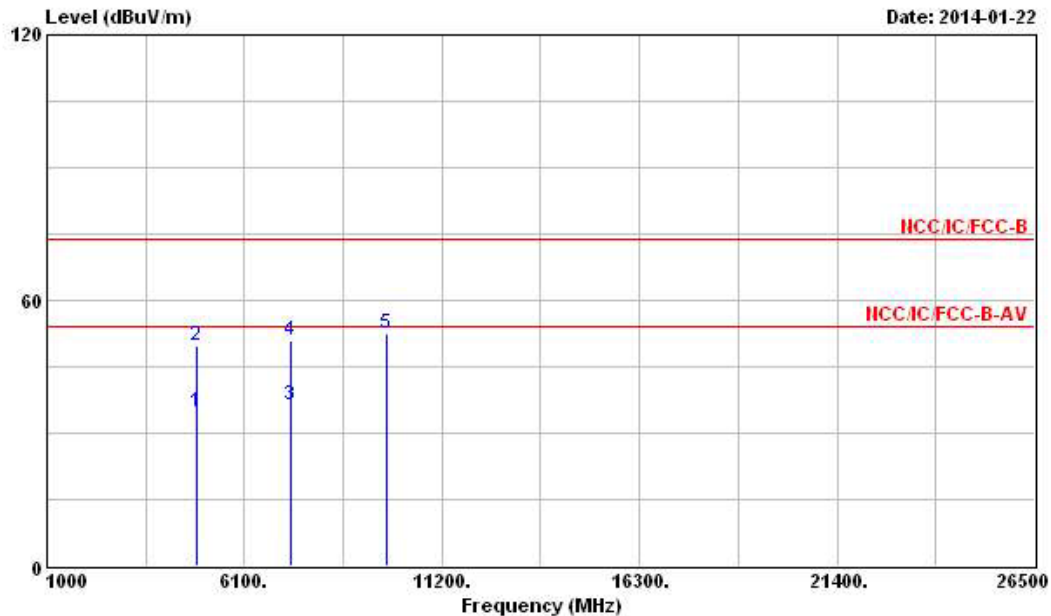
Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
2483.970	-29.40	3.62	-25.78	-4.58	-21.2	Peak
2483.500	-47.56	3.62	-43.94	-2.74	-41.2	Average
4917.270	-45.97	3.62	-42.35	-21.15	-21.2	Peak
4934.040	-56.90	3.62	-53.28	-12.08	-41.2	Average

Note 1 : The above modulation modes have the worst test results and record in the report.

Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

Band Edge Test Plot

Harmonic Emissions Test Plot


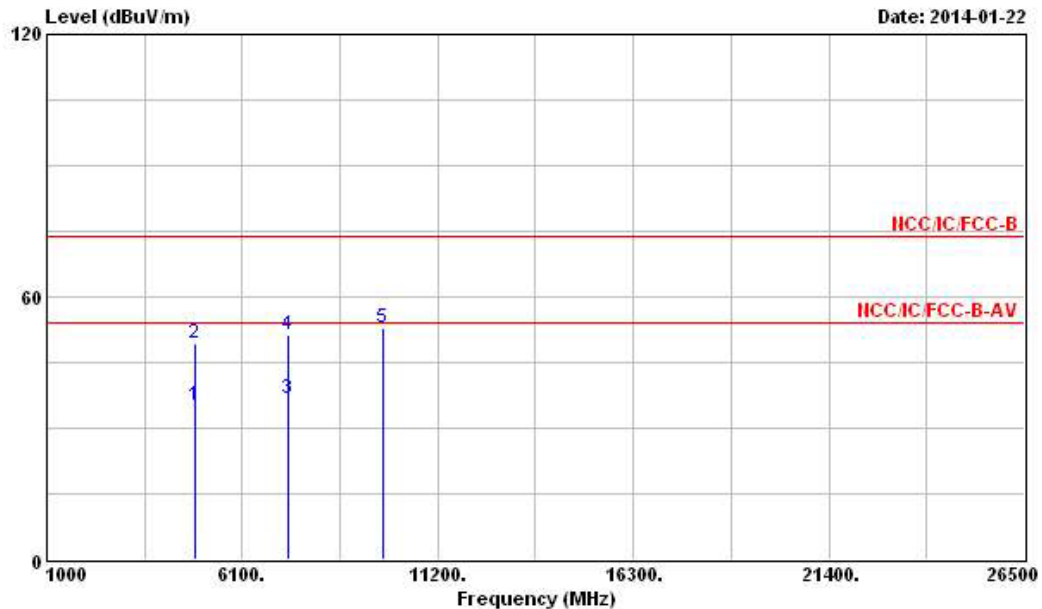
Operating Mode	11g_6Mbps	Polarization	H
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4874.000	34.62	-19.38	54.00	30.24	34.32	4.73	34.67 Average	---	---
2	4874.000	49.64	-24.36	74.00	45.26	34.32	4.73	34.67 Peak	---	---
3	7311.000	36.37	-17.63	54.00	29.97	35.88	5.47	34.95 Average	---	---
4	7311.000	50.76	-23.24	74.00	44.36	35.88	5.47	34.95 Peak	---	---
5	9748.000	52.64			44.88	36.71	6.41	35.36 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Operating Mode	11g_6Mbps	Polarization	V
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4874.000	34.95	-19.05	54.00	30.57	34.32	4.73	34.67 Average	---	---
2	4874.000	49.47	-24.53	74.00	45.09	34.32	4.73	34.67 Peak	---	---
3	7311.000	36.54	-17.46	54.00	30.14	35.88	5.47	34.95 Average	---	---
4	7311.000	51.34	-22.66	74.00	44.94	35.88	5.47	34.95 Peak	---	---
5	9748.000	52.84			45.08	36.71	6.41	35.36 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

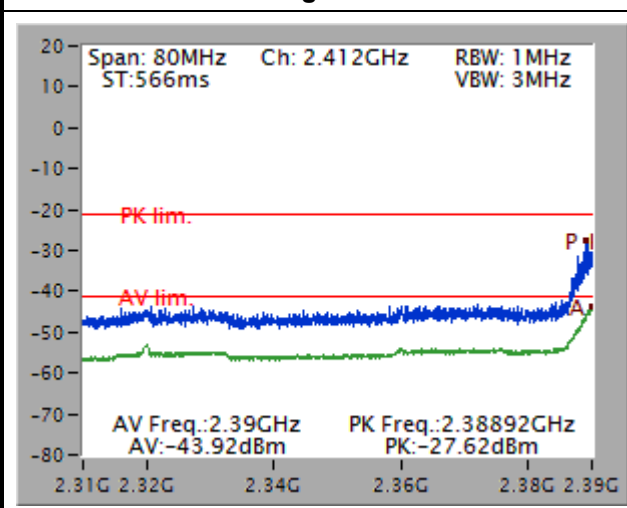
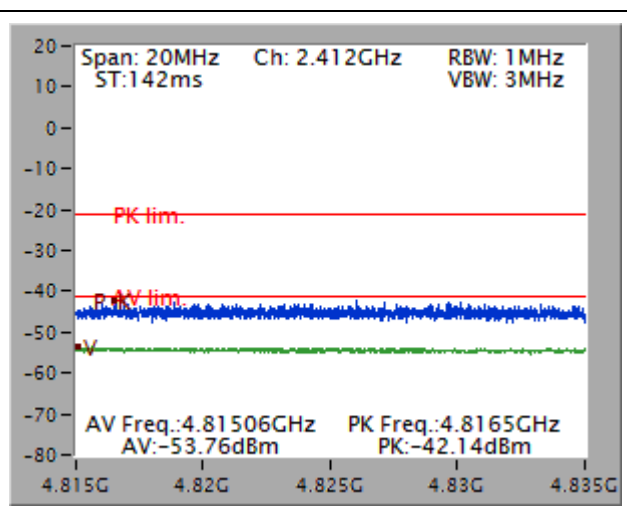
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Modulation: HT-20 MCS0; Test Frequency: 2412 MHz; number of TX Chain: 1
Transmitter Conducted Unwanted Emissions Result in Restricted Bands

Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
2388.920	-31.24	3.62	-27.62	-6.42	-21.2	Peak
2390.000	-47.54	3.62	-43.92	-2.72	-41.2	Average
4816.500	-45.76	3.62	-42.14	-20.94	-21.2	Peak
4815.060	-57.38	3.62	-53.76	-12.56	-41.2	Average

Note 1 : The above modulation modes have the worst test results and record in the report.

Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

Band Edge Test Plot

Harmonic Emissions Test Plot

Modulation: HT-20 MCS0; Test Frequency: 2437 MHz; number of TX Chain: 1
Transmitter Conducted Unwanted Emissions Result in Restricted Bands

Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
4872.530	-45.41	3.62	-41.79	-20.59	-21.2	Peak
4884.480	-57.44	3.62	-53.82	-12.62	-41.2	Average

Note 1 : The above modulation modes have the worst test results and record in the report.

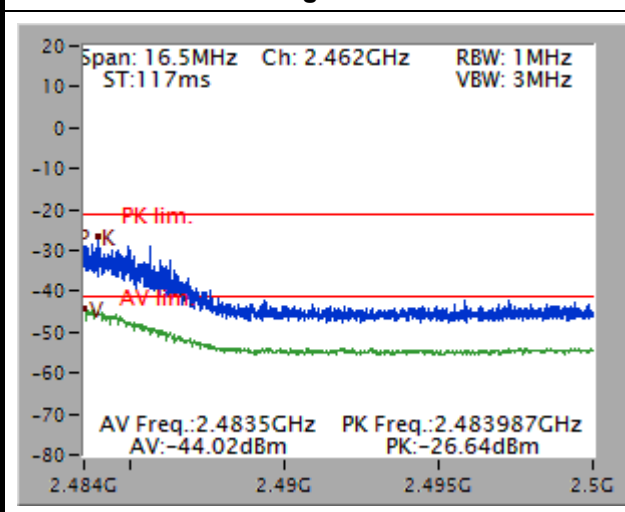
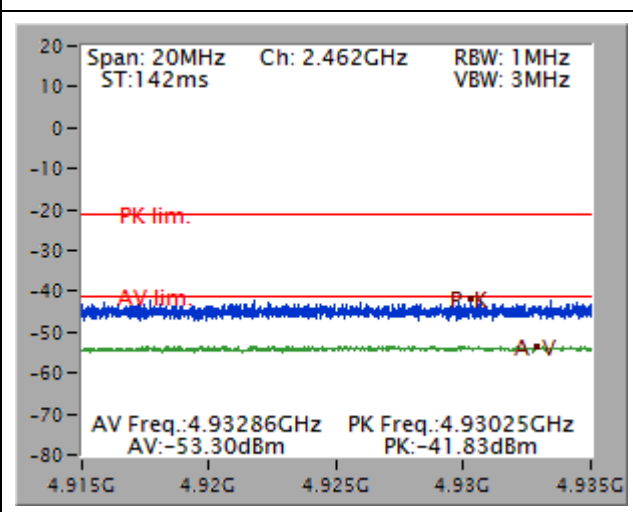
Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

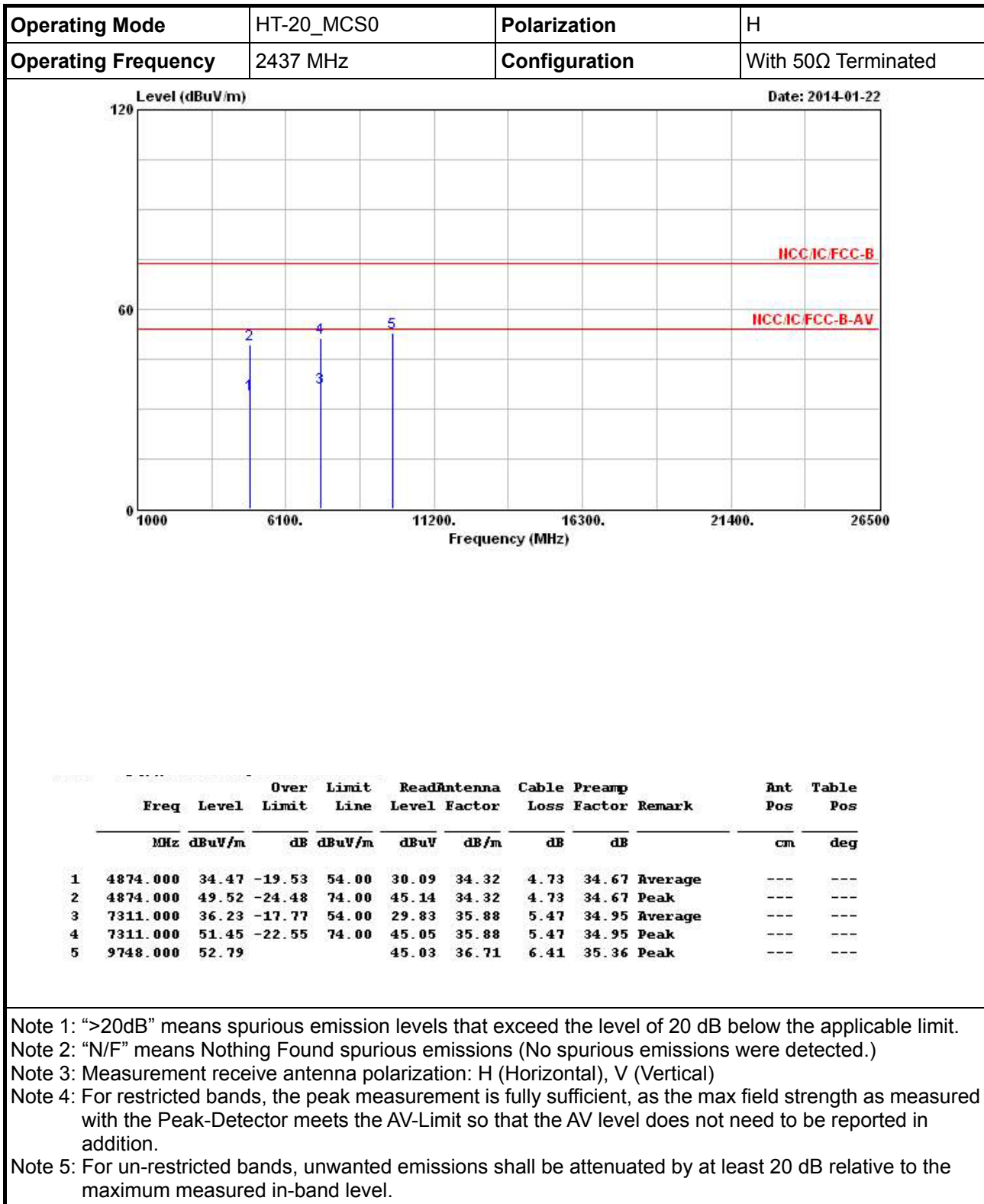
Modulation: HT-20 MCS0; Test Frequency: 2462 MHz; number of TX Chain: 1
Transmitter Conducted Unwanted Emissions Result in Restricted Bands

Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
2483.987	-30.26	3.62	-26.64	-5.44	-21.2	Peak
2483.500	-47.64	3.62	-44.02	-2.82	-41.2	Average
4930.250	-45.45	3.62	-41.83	-20.63	-21.2	Peak
4932.860	-56.92	3.62	-53.30	-12.10	-41.2	Average

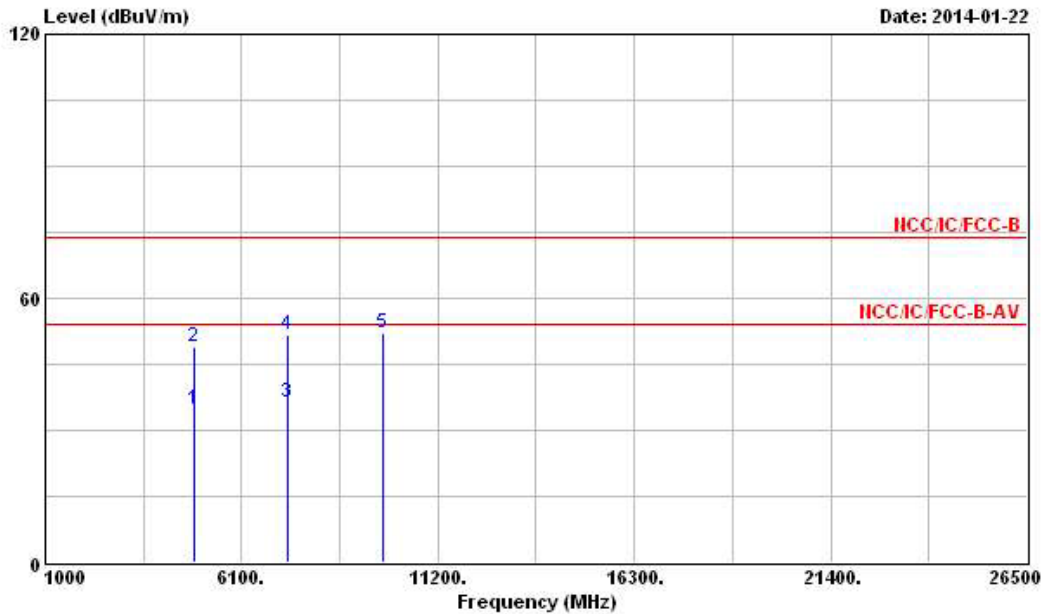
Note 1 : The above modulation modes have the worst test results and record in the report.

Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

Band Edge Test Plot

Harmonic Emissions Test Plot




Operating Mode	HT-20_MCS0	Polarization	V
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	34.58	-19.42	54.00	30.20	34.32	4.73	34.67	Average	---	---
2	4874.000	49.13	-24.87	74.00	44.75	34.32	4.73	34.67	Peak	---	---
3	7311.000	36.30	-17.70	54.00	29.90	35.88	5.47	34.95	Average	---	---
4	7311.000	51.80	-22.20	74.00	45.40	35.88	5.47	34.95	Peak	---	---
5	9748.000	52.03			44.27	36.71	6.41	35.36	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

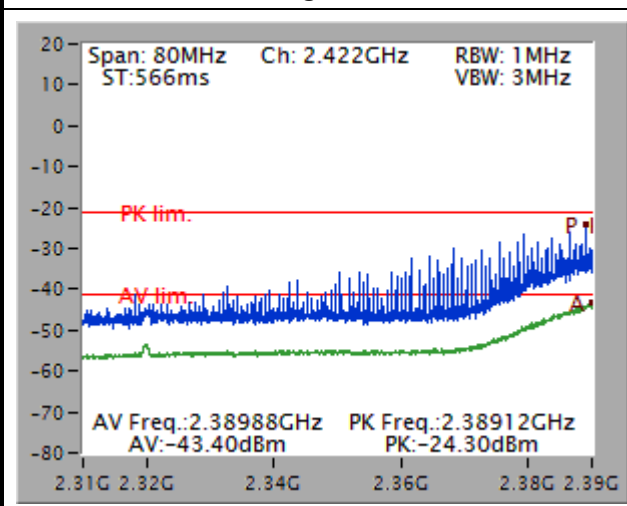
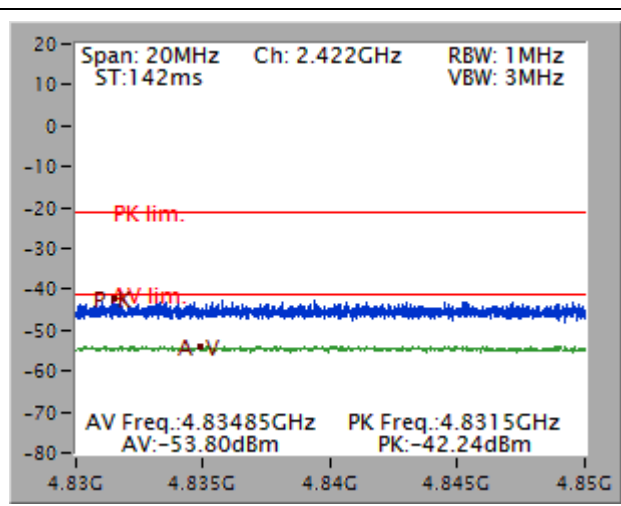
Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Modulation: HT-40 MCS0; Test Frequency: 2422 MHz; number of TX Chain: 1
Transmitter Conducted Unwanted Emissions Result in Restricted Bands

Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
2389.120	-27.92	3.62	-24.30	-3.10	-21.2	Peak
2389.880	-47.02	3.62	-43.40	-2.20	-41.2	Average
4831.500	-45.86	3.62	-42.24	-21.04	-21.2	Peak
4834.850	-57.42	3.62	-53.80	-12.60	-41.2	Average

Note 1 : The above modulation modes have the worst test results and record in the report.

Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

Band Edge Test Plot

Harmonic Emissions Test Plot

Modulation: HT-40 MCS0; Test Frequency: 2437 MHz; number of TX Chain: 1
Transmitter Conducted Unwanted Emissions Result in Restricted Bands

Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
4883.690	-46.08	3.62	-42.46	-21.26	-21.2	Peak
4876.110	-57.23	3.62	-53.61	-12.41	-41.2	Average

Note 1 : The above modulation modes have the worst test results and record in the report.

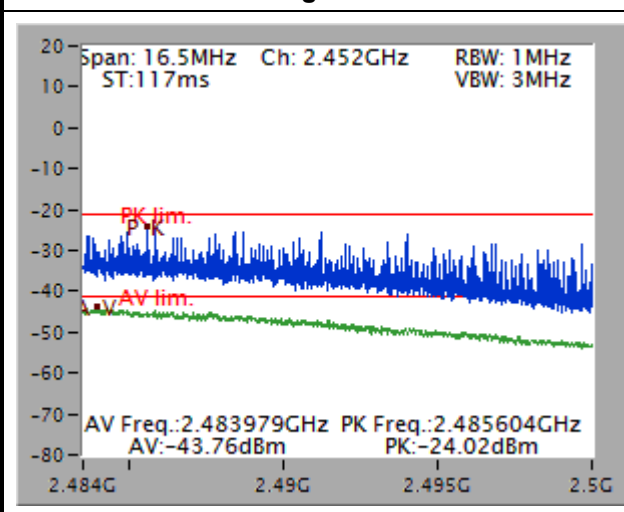
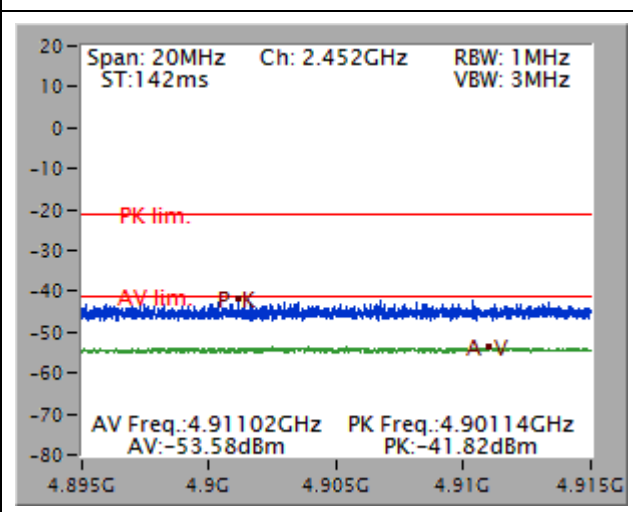
Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

Modulation: HT-40 MCS0; Test Frequency: 2452 MHz; number of TX Chain: 1
Transmitter Conducted Unwanted Emissions Result in Restricted Bands

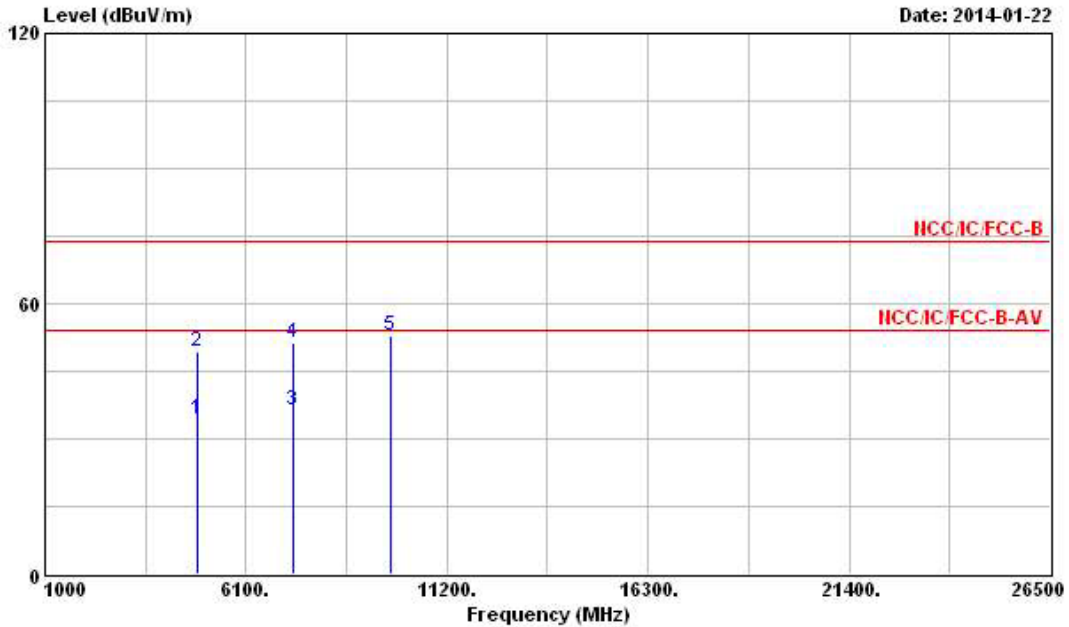
Frequency (MHz)	Test Level (dBm)	Antenna Gain (dBi)	EIRP Level (dBm)	Margin (dB)	Limit (dBm)	Level Type
2485.604	-27.64	3.62	-24.02	-2.82	-21.2	Peak
2483.979	-47.38	3.62	-43.76	-2.56	-41.2	Average
4901.140	-45.44	3.62	-41.82	-20.62	-21.2	Peak
4911.020	-57.20	3.62	-53.58	-12.38	-41.2	Average

Note 1 : The above modulation modes have the worst test results and record in the report.

Note 2 : All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported

Band Edge Test Plot

Harmonic Emissions Test Plot


Operating Mode	HT-40_MCS0	Polarization	H
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	34.37	-19.63	54.00	29.99	34.32	4.73	34.67	Average	---	---
2	4874.000	49.15	-24.85	74.00	44.77	34.32	4.73	34.67	Peak	---	---
3	7311.000	36.38	-17.62	54.00	29.98	35.88	5.47	34.95	Average	---	---
4	7311.000	51.39	-22.61	74.00	44.99	35.88	5.47	34.95	Peak	---	---
5	9748.000	52.72			44.96	36.71	6.41	35.36	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

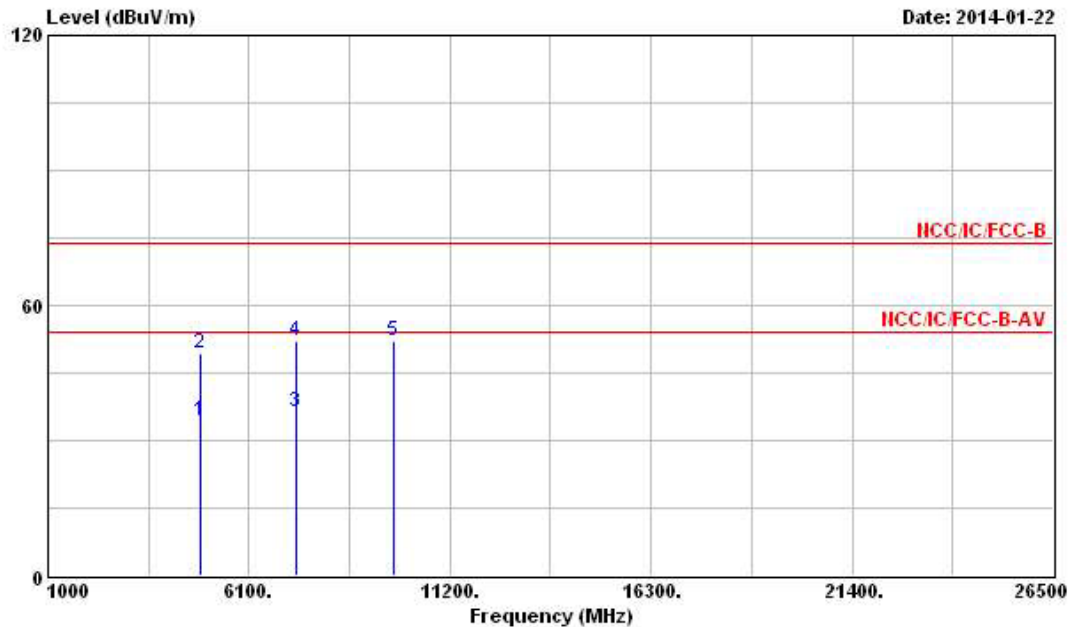
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Operating Mode	HT-40_MCS0	Polarization	V
Operating Frequency	2437 MHz	Configuration	With 50Ω Terminated



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4874.000	34.49	-19.51	54.00	30.11	34.32	4.73	34.67 Average	---	---
2	4874.000	49.40	-24.60	74.00	45.02	34.32	4.73	34.67 Peak	---	---
3	7311.000	36.39	-17.61	54.00	29.99	35.88	5.47	34.95 Average	---	---
4	7311.000	51.94	-22.06	74.00	45.54	35.88	5.47	34.95 Peak	---	---
5	9748.000	52.20			44.44	36.71	6.41	35.36 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

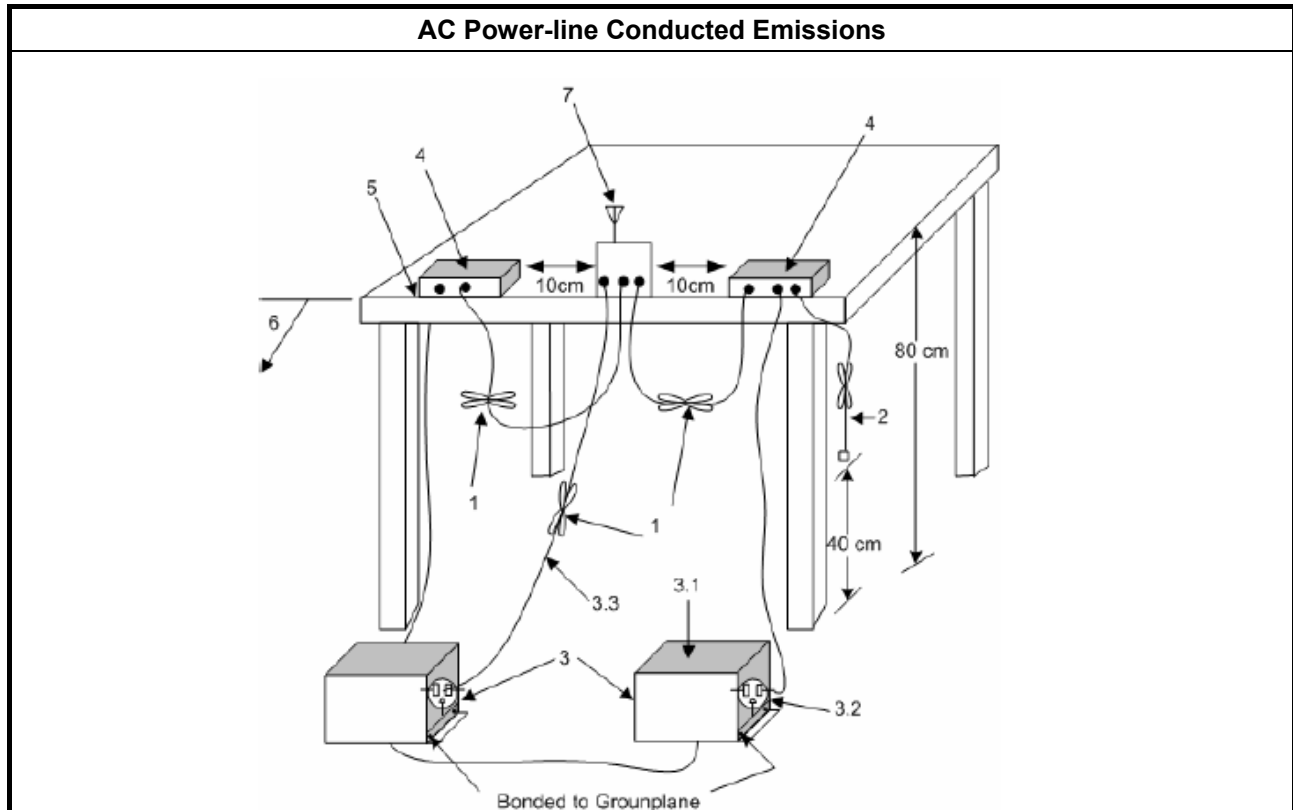
Note 5: For un-restricted bands, unwanted emissions (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

3.6 AC Power-line Conducted Emissions

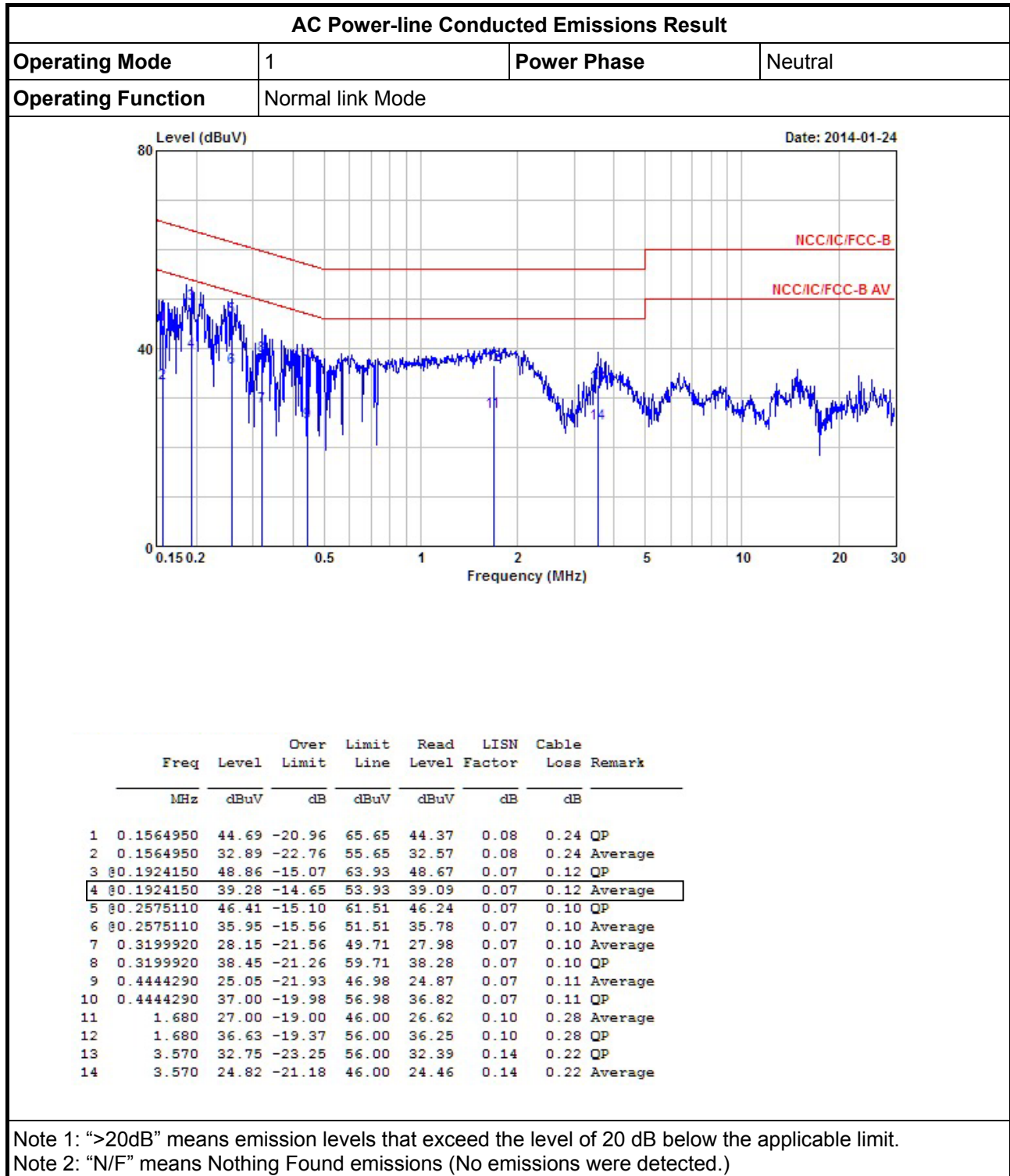
3.6.1 Test Procedures

Test Method
☒ Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

3.6.2 Test Setup

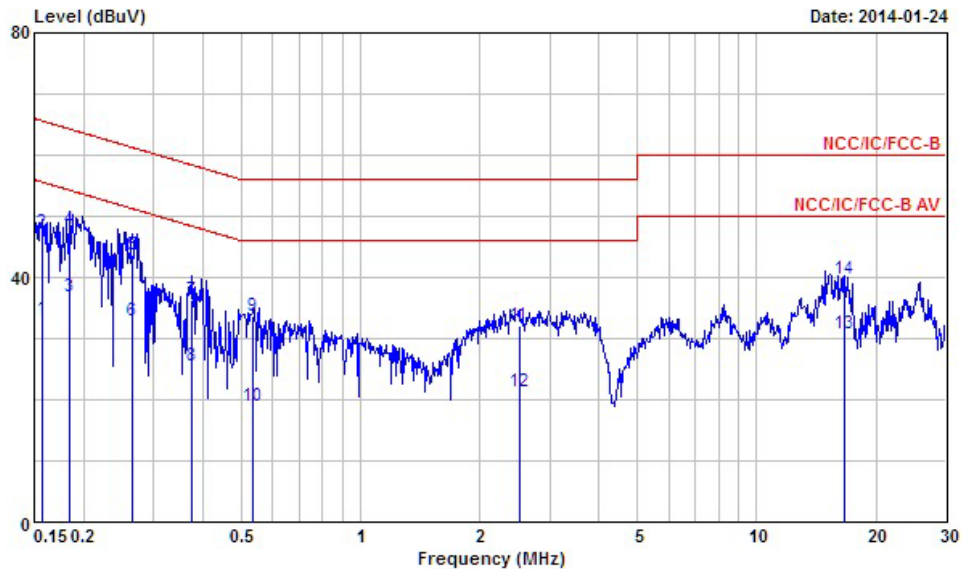


3.6.3 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Normal link Mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1564950	33.25	-22.40	55.65	32.91	0.10	0.24	Average
2	0.1564950	47.25	-18.40	65.65	46.91	0.10	0.24	QP
3	0.1844300	36.83	-17.45	54.28	36.58	0.10	0.15	Average
4	0.1844300	47.89	-16.39	64.28	47.64	0.10	0.15	QP
5	0.2658290	43.64	-17.61	61.25	43.44	0.10	0.10	QP
6	0.2658290	32.84	-18.41	51.25	32.64	0.10	0.10	Average
7	0.3731370	36.43	-22.00	58.43	36.23	0.10	0.10	QP
8	0.3731370	25.62	-22.81	48.43	25.42	0.10	0.10	Average
9	0.5349810	33.64	-22.36	56.00	33.41	0.10	0.13	QP
10	0.5349810	18.96	-27.04	46.00	18.73	0.10	0.13	Average
11	2.510	32.12	-23.88	56.00	31.71	0.14	0.27	QP
12	2.510	21.38	-24.62	46.00	20.97	0.14	0.27	Average
13	16.660	30.73	-19.27	50.00	30.30	0.30	0.13	Average
14	16.660	39.71	-20.29	60.00	39.28	0.30	0.13	QP

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Mar. 25, 2013	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-666	9kHz ~ 30MHz	Nov. 29, 2013	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+012	9kHz ~ 30MHz	Oct. 30, 2013	Conduction (CO04-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	100305	9KHz~40GHz	Feb. 06, 2013	Conducted (TH06-HY)
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 16, 2013	Conducted (TH06-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jun. 27, 2013	Conducted (TH06-HY)
RF Cable-2m	HUBER+SUHNER	SUCOFLEX_104	SN 345673/4	30MHz ~ 26.5GHz	Dec. 02, 2013	Conducted (TH06-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Oct. 03, 2013	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 11, 2013	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	Jul. 18, 2013	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	Aug. 28, 2013	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 25, 2013	Radiation (03CH02-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 10, 2014	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 09, 2013	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 05, 2013	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 10, 2013	Radiation (03CH02-HY)
Turn Table	Chaintek Instruments	3000	MF7802058	0~ 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	MF	MF7802	MF780208205	1 ~ 4 m	N/A	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz - 30 MHz	Dec. 02, 2012	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is two year.